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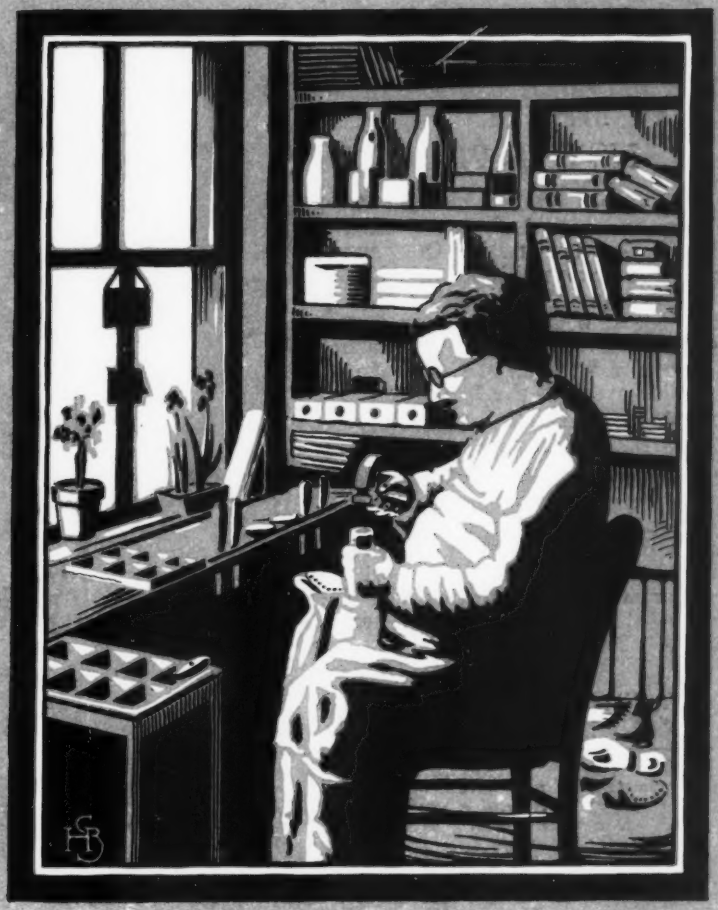
THE INDUSTRIAL ARTS MAGAZINE



FEBRUARY 1923

THE BRUCE PUBLISHING COMPANY
MILWAUKEE - WISCONSIN

ATKINS SILVER STEEL SAWS

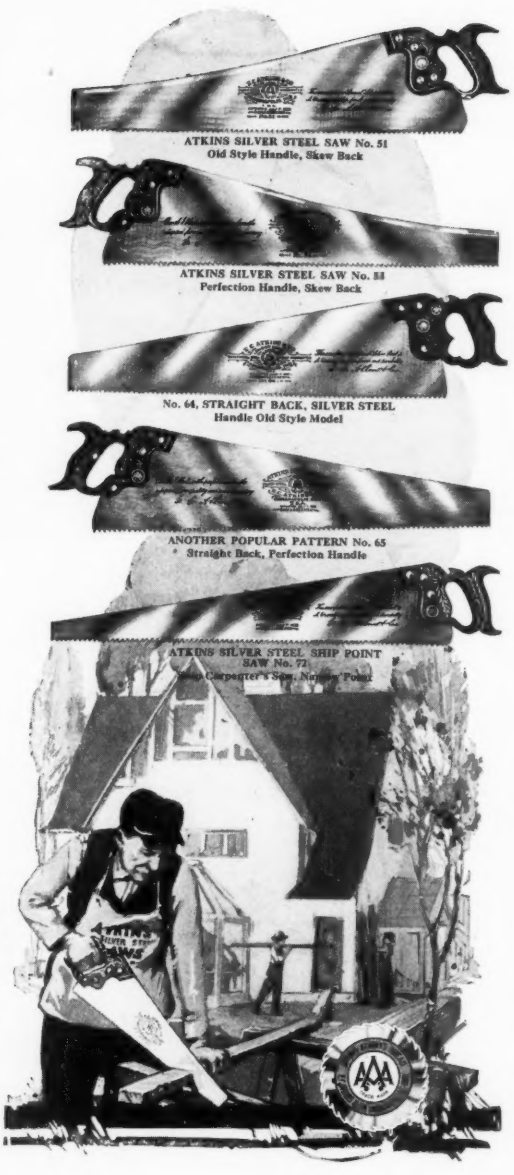
ATKINS— THE SAW MASTER CARPENTERS PREFER

A Silver Steel Saw cuts straight and true to the line because it is smithed and blocked carefully by a skilled saw-smith. Ordinary cheap saws do not receive this extra added workmanship. A blade of steel with a piece of wood fastened on with screws may look like a saw, but will never act like one or take the place of a real saw, without the tension and alignment imparted to the blade by the skill of a sawsmith.

In the Atkins factories, smithing and blocking are done by experts, the envied "elite" of our workers, many of whom have been with us for a quarter of a century and upwards. Smithing and blocking consist of imparting to the saw a series of blows with a hammer to remove unequal strains, and to make the blade flat, smooth and even in tension throughout. As a result,

"The Finest On Earth."

Send us a quarter for nail apron, Saw Sense—the book of facts, and a useful souvenir. Mention your dealer's name when writing.


ATKINS SILVER STEEL SAW No. 51
Old Style Handle, Skew Back
ATKINS SILVER STEEL SAW No. 84
Perfection Handle, Skew Back
No. 64, STRAIGHT BACK, SILVER STEEL
Handle Old Style Model
ANOTHER POPULAR PATTERN No. 65
Straight Back, Perfection Handle
ATKINS SILVER STEEL SHIP POINT
SAW No. 72

E.C. ATKINS & CO.

ESTABLISHED 1857 THE SILVER STEEL SAW PEOPLE

Home Office and Factory, INDIANAPOLIS, INDIANA

Canadian Factory, Hamilton Ontario

Machine Knife Factory, Lancaster N.Y.

Branches Carrying Complete Stocks In The Following Cities:

Atlanta	New Orleans	Seattle
Memphis	New York City	Paris, France
Chicago	Portland, Ore.	Sydney, N. S. W.
Minneapolis	San Francisco	Vancouver, B.C.

Johnson's Artistic Wood Finishes are very easy to use. Boys in the Fifth and Sixth Grades can use them successfully. Simple instructions are printed on every label. Whenever specific information is desired—do not hesitate to write us. Our Individual Advice Department will gladly help solve your wood finishing problems.

Johnson's Wood Dye is manufactured in fourteen shades and Johnson's Paste Wood Filler in five shades. All shades of Wood Dye may be easily lightened or darkened. Complete instructions are given on every label. By lightening, darkening and intermixing, hundreds of different shades are easily obtainable.

FREE - Book on Wood Finishing

THE finishing of manual training models is assuming more and more importance every year. Surely it is a subject which should be given its share of attention, for a beautiful model may be ruined if improperly finished, whereas the defects of a poorly constructed model are minimized if well finished.

Our Book on Wood Finishing is a valuable text book and should be in the hands of every Wood Finishing Instructor. It is full of information on finishing all wood—soft and hard. It is the work of experts—profusely illustrated in color.

Johnson's Artistic Wood Finishes are economical because they always give satisfaction. The cost of finishing material for an article of furniture is such a small percentage of the entire cost, that the best finish obtainable is none too good. Reliable, high quality wood finishes such as Johnson's are always more satisfactory.

With Johnson's Wood Dye it is both possible and practical to finish up complete turned articles such as lamp stands, candle sticks, etc., while they are still in the lathe. Johnson's Wood Dye penetrates deeply — brings out the beauty of the grain without raising it in the slightest—dries in four hours and does not rub off or smudge.

JOHNSON'S *Artistic* WOOD FINISHES

Johnson's Artistic Wood Finishes are now being used in nine-tenths of the schools in the United States and Canada. They are particularly adapted for manual training work as they may be applied by the youngest and most inexperienced pupils with good results.

The finishes most popular among Manual Training Instructors and Pupils are:—Johnson's Wood Dye, Prepared Wax, Under-Lac, Paste Wood Filler, Varnishes, Perfectone Undercoat and Enamel. We have a very attractive exhibit of wood panels finished with these products which we are glad to send, free and postpaid, to Manual Training Instructors who will give it wall space in their shops.

All of Johnson's products may be quickly used—models may be finished with Johnson's Wood Dye and Prepared Wax in one period. This is particularly advantageous in crowded centers, and in grade work, where it is necessary to hold the attention of the children. It does away with the necessity of having models laying around to dry.

Johnson's Artistic Wood Finishes are being used all over the world by artisans and amateurs. Architects and contractors specify Johnson's line for coloring woodwork and flooring in new buildings. Painters and decorators use Johnson's Wood Finishes with equal satisfaction on new and old work. Upholsterers, furniture repairers and cabinet makers find it "just the thing" for their use.

S. C. JOHNSON & SON, Dept. I.A. 2, Racine, Wis.,
"The Wood Finishing Authorities"

Please send me free and postpaid your authoritative book on Artistic Wood Finishing as applied to manual training work.

We buy stains and varnishes from.....

My Name.....

My Address.....

City and State.....

"Just the machine for your pupils"

"This Goodell-Pratt Bench Lathe is a mighty serviceable and practical piece of machinery for any trade or technical school," declares Mr. Punch.

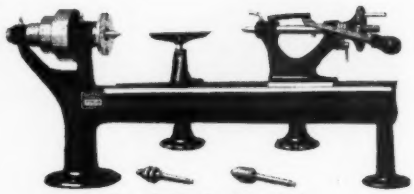
A bench lathe like this is an all-round machine. It does both elementary manual training exercises and advanced work. It requires less than ¼ horsepower and does a job quickly and accurately. Besides, this lathe is sold at a surprisingly low price, within the means of any school.

Because you buy tools to stand the wear and tear of rough and continuous usage, you will find it worth while to get this Goodell-Pratt Bench Lathe. Mechanics, artisans, carpenters, and home putterers have learned to place confidence and faith in this machine and every tool that bears the name of Goodell-Pratt.

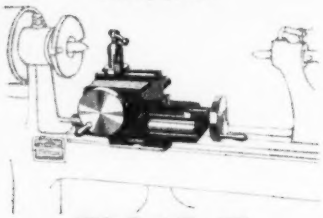
Write for further information concerning this bench lathe and for our free illustrated catalog No. 14 showing hundreds of different tools, many of which are just what technical and vocational training schools need.

GOODELL-PRATT COMPANY, Greenfield, Mass., U. S. A.

Toolsmiths



Bench Lathe No. 494
Price, $40.00



Slide Rest No. 132
Price, $16.00

Countershaft No. 130
Price, $11.00

GOODELL-PRATT
1500 GOOD TOOLS

MAYDOLE HAMMERS
THE WORLD'S STANDARD

There are none better made—none better known. When you buy these hammers, you are certain of getting the best. They are used the world over.

Maydole Hammers are made of finest quality material, and guaranteed first-class in every respect.

Write for our booklet of useful information, which every student should have. How many shall we send?

The David Maydole Hammer Company
NORWICH NEW YORK U. S. A.

EFFICIENT SERVICE

Williams' "Falcon" Chain Pipe and Fittings Wrench offers most efficient service.

Double-ended, reversible jaw assures service of two wrenches at the cost of one. Three to four grip positions on every size pipe. Interchangeable flat link and cable chain — suit yourself.

Six sizes for ⅛ to 12″ pipe and fittings.

J. H. WILLIAMS & CO.
"The Wrench People"

BROOKLYN	BUFFALO	CHICAGO
157 Richards St.	157 Vulcan St.	1157 W. 120th St.

THE JOHNSON FRICTION CLUTCH

INSTALLED on LINE SHAFTING

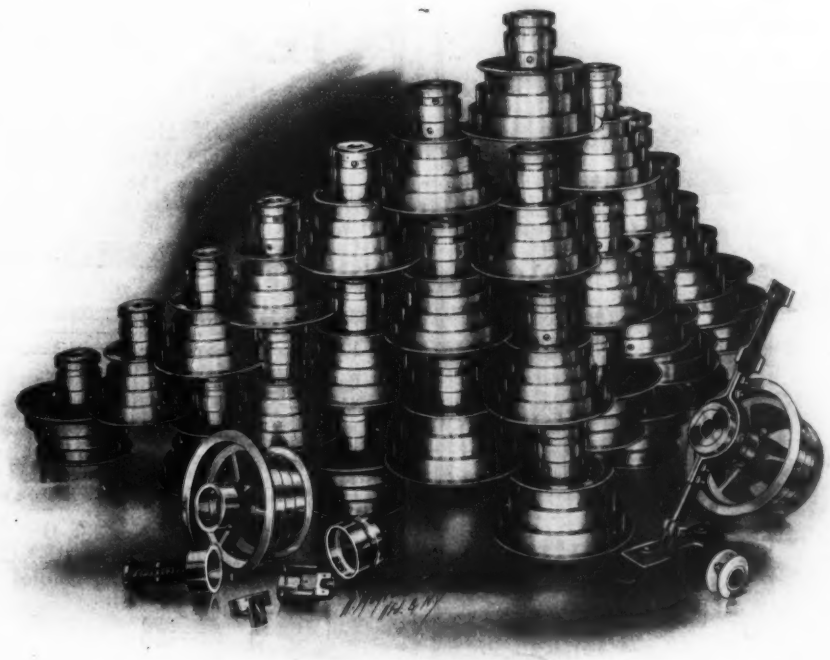
in

THE TECHNICAL HIGH SCHOOL

Springfield, Mass.

has been driving WOOD-WORKING LATHES for the past 15 years, and are still operating satisfactorily.

The illustration below shows a quantity of **Johnson Clutches** with four step cone pulley mounted on the clutch hubs which were shipped to them at that time.



Courtesy: The Technical High School, Springfield, Mass.

Johnson Clutches soon pay for themselves by the saving in power, pulleys, counter shafts, overhead belting and other unnecessary equipment.

Standard slow speed clutches are carried in stock for immediate shipment.

High speed clutches are made to meet each particular condition and deliveries are very good.

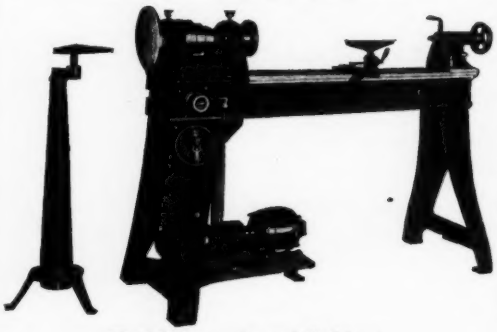
Write for "IAM" Catalog.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

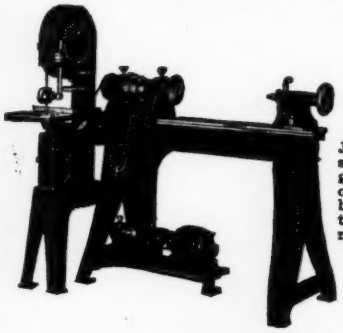
LITTLE GIANT

MANUAL TRAINING DEPARTMENT

SPECIAL EQUIPMENT

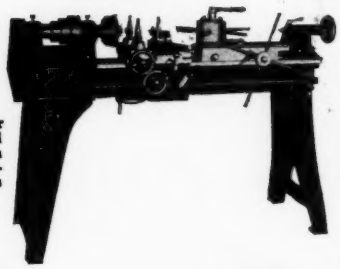


Wood Lathe—motor or belt driven.



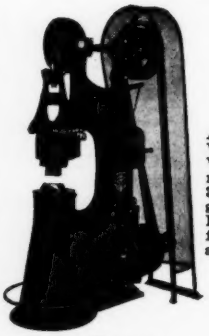
Combination Wood Lathe and Band Saw.

Jointer, planer, jig-saw, sander, buffer, grinder, mortiser and other equipment can be furnished and attached in a similar manner.



Metal Lathe—Motor or Belt Driven.

Miller, planer, gear cutter, grinder and other equipment can be furnished and attached the same as with wood lathe.



Power Hammer—Motor or Belt Driven.

All Little Giant Wood and Metal Working Equipment is sold on 30 days' trial, and guaranteed FOREVER against defective material and workmanship.

Band Saw—Motor or Belt Driven.

LITTLE GIANT COMPANY

Established 1876

223 Rock St. Mankato, Minn., U .S. A.

TRADE MARK

"STAR"

Hack Saws

HAVE STOOD THE

TEST OF TIME

CLEMSON BROS., Inc.

MIDDLETOWN, N. Y.

Makers Since 1883

Established 1847 **Incorporated 1878**

H. B. SMITH OF SMITHVILLE

Woodworking Machinery

New No. 338-B

VARIETY SAW BENCH

With Tilting Table

The Machine is equipped with Cross-Cutting and Slotting Gauges, and Safety Guards. Driven by Belt or Motor.

ADDRESS

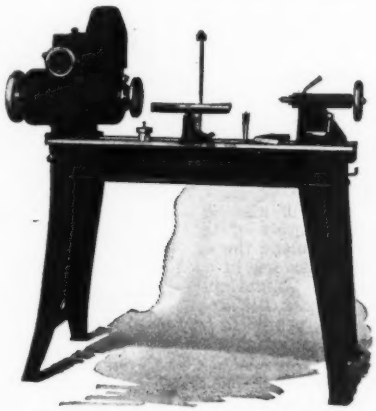
H. B. Smith Machine Co.

Smithville, N. J., U. S. A.

Or Nearest Branch

NEW YORK CHICAGO ATLANTA SAN FRANCISCO

"Oliver" Leads Again



Speed Lathes were the very first woodworking machines to be motorized — in the sense that the shaft of the motor and the spindle of the machine are one and the same.

"Oliver" Motor Head Speed Lathes of the direct current type were the first lathes of this type produced. Those old original lathes, while not as refined as those built now, are still doing excellent work. After all it is the satisfactory operation over a period of years that is the real test.

The "Oliver" Adjustable Speed Alternating Current Motor Head Stock Lathe is another distinct step forward in the development of better machinery. It is not a four speed machine but operates at any speed from 600 to 3000 R. P. M. It will operate on one, two or three phase current. This makes the alternating current lathe just as flexible as the direct current lathe and offers for the first time at a moderate price a motor head lathe that will operate on a single phase current. Write for full particulars. (You might consult the authorities at Minneapolis regarding these new lathes—they have seventy-four of them in the public schools.)

At the right an "Oliver" Motor Head Speed Lathe is pictured turning a small gear blank in the Pattern Shop at the Chase Metal Works, Waterbury, Conn. It saves them time and its convenience, flexibility, and accuracy are most satisfying.

In the big shops where things are done as nearly right as man can do them, you will find "Oliver" Machinery — because better equipment means better output.

That is what you are looking for, too. Your output may be boys instead of patterns or furniture, but good machinery in the school shop is as important as good instructors, and it helps to make better boys and men.

Oliver Machinery Co.

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SKINNER CHUCKS

A BOOK OF INFORMATION FOR CHUCK USERS

A book that shows the various types of chucks and their uses, together with suggestions as to the care of chucks, best methods of setting up, best way to handle certain operations, should be useful to the student.

We have just published such a booklet, called

"CHUCKS AND THEIR USES"

This booklet contains all the information, based on the experience gained and the data collected as a result of more than thirty years' experience in building chucks.

We shall be glad to send to any interested person a copy of "Chucks and Their Uses." We will also send to vocational directors a supply of these booklets for distribution among the students who may be able to make use of them.

There is no obligation—no charge. Our compensation is the knowledge that we are assisting people to better understand the proper use of chucks.

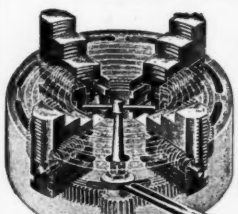
Send for your copy now, giving your full name and that of your employer.

THE SKINNER CHUCK COMPANY
NEW BRITAIN, CONN. U. S. A.
ESTABLISHED 1887

DURABILITY — ACCURACY — STRENGTH

are striking features of

Westcott Chucks



Spur Geared Scroll Combination Lathe Chuck

They are as essential in the schoolroom as in the commercial shop. The student who learns his trade using the very best of tools and equipment, is sure to benefit in the end.

In the case of chucks—
BUY WESTCOTT

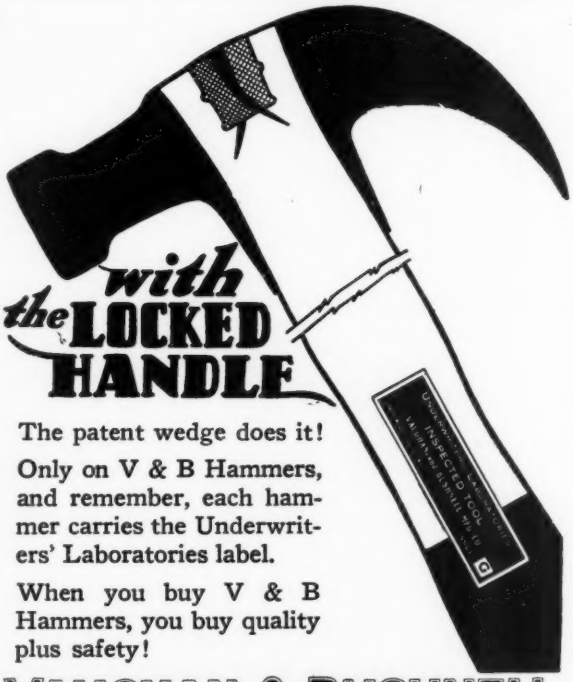
Little Giant Double Grip Drill Chuck

Mainly About Your Classes

If you are not using Westcott Chucks now, you should certainly give your boys this advantage. Their best work can only be accomplished on the best equipment. Specify Westcott Chucks on your next order—in the meantime send for our catalogue.

Manufacturers of chucks for every class of work.

WESTCOTT CHUCK COMPANY
Oneida, New York



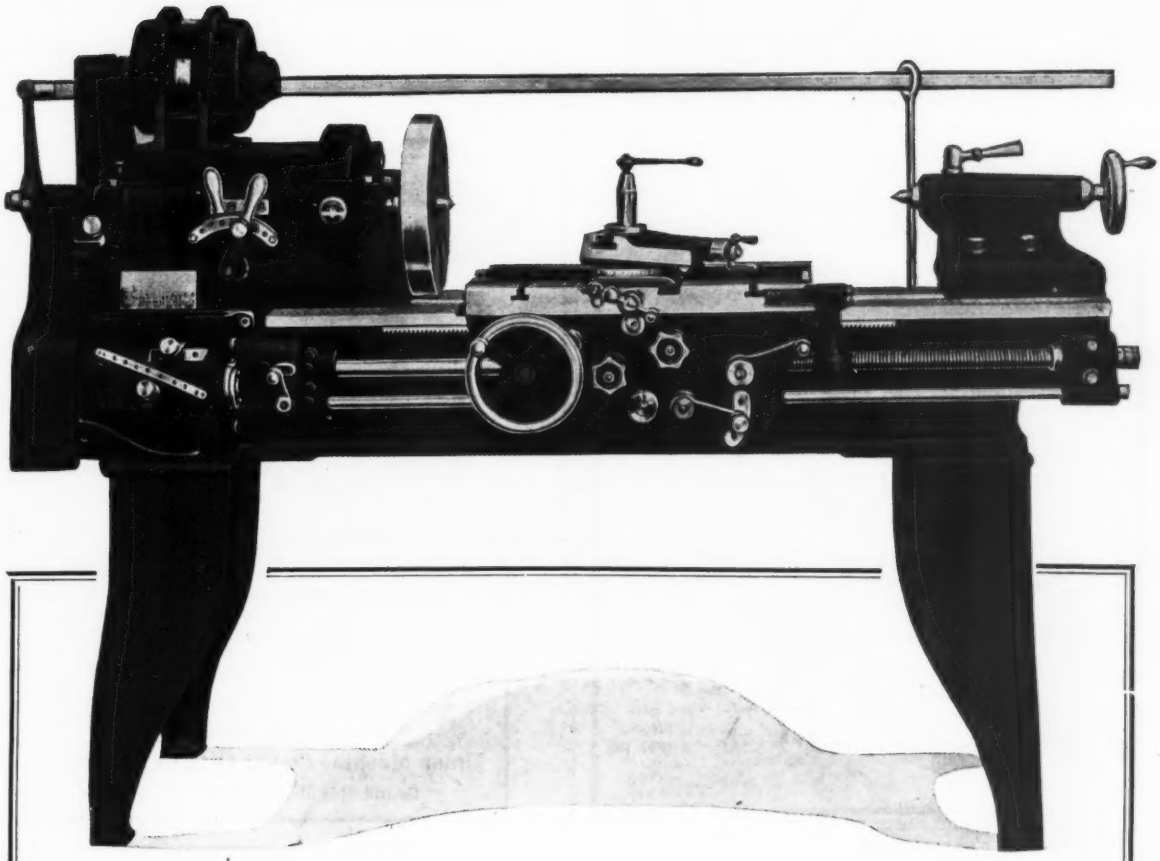
with the LOCKED HANDLE

The patent wedge does it!

Only on V & B Hammers, and remember, each hammer carries the Underwriters' Laboratories label.

When you buy V & B Hammers, you buy quality plus safety!

VAUGHAN & BUSHNELL MANUFACTURING COMPANY
Makers of Fine Tools
2114 Carroll Ave. Chicago, Ill. U. S. A.



14″x6′ Monarch Motor Driven Lathe. One of the very finest lathes in the world. Hundreds in use in Vocational Schools. Smaller and larger sizes of Monarch Lathes fit every school requirement. Let us submit prices.

The Monarch Machine Tool Co.

304 Oak Street **Sidney, Ohio**

WALLACE BENCH MACHINES

Over 500 school woodworking shops have installed Wallace Portable Electric Bench Machines. Thousands of woodworking shops throughout the country—from one-man shops to the largest—are daily using bench machines to speed up production and eliminate handwork. Write for descriptive bulletin and prices.

J. D. WALLACE & CO.
1415 W. Jackson Blvd., Chicago, Ill.

WALLACE BENCH
6" Jointer
4" Planer
Universal Saw
Plain Saw
16" Band Saw
Electric Sifter
Electric Glue Pot

UNION PORTABLE

Union 6 Inch Jointer

6" Jointer
16" Band Saw
Universal Saw Bench
Plain Saw Bench
4" Jointer
Single Spindle Shaper
Comb. Universal Saw and 6" Jointer

THEY ARE ON WHEELS
Take the machine to the job

Also Furnished As BENCH TYPE MACHINES.

We recommend machines with the base which makes them conveniently portable.

All machines equipped with suitable motor with convenient switch to start or stop. Any lamp socket acts as your power supply line. Safety provisions have been taken care of to the absolute limit.

Send for Bulletin and Prices

Union Machine Co., 31 Ottawa Ave. N.W.
Grand Rapids, Michigan, U. S. A.

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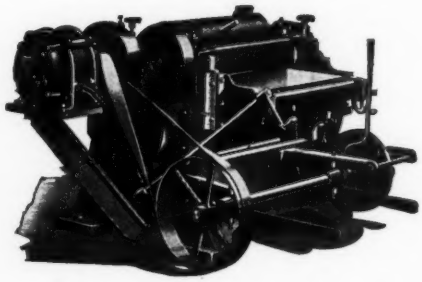
MACHINES AND TOOLS
For
SHEET METAL WORK

If not already equipped, eventually you will join some four hundred progressive schools in voicing favorable expression for what this course offers and how Pexto equipment has helped to make the work a success.

Our Engineering Department is at your service.

THE PECK, STOW & WILCOX CO.

SOUTHINGTON, - CONN.



CRESCENT WOOD WORKING MACHINERY in your wood working department will give the same satisfactory service that the machines are delivering in thousands of factories throughout the world.

Send today for catalog of band saws, saw tables, jointers, borers, disk grinders, planers, planers and matchers, swing saws, cut off tables, shapers, mortisers, variety wood workers, universal wood workers.

The Crescent Machine Co.

25 Main Street
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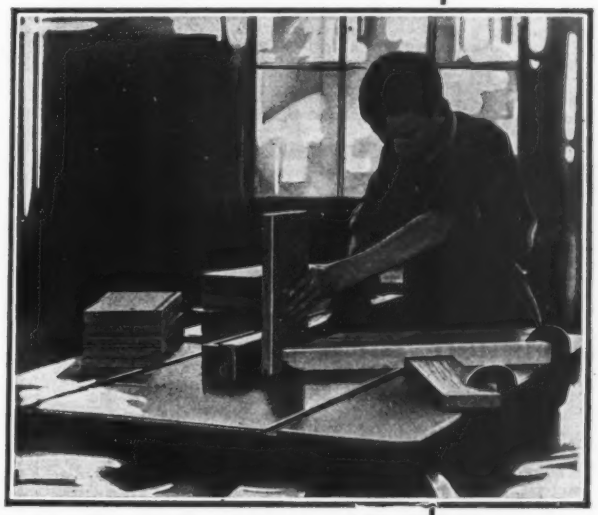
TEACHERS — $10,000 for your Ideas

OVER TEN THOUSAND ($10,000) in cash and valuable prizes given to teachers of Cabinet Making and Directors of Vocational Education having under their charge this activity of vocational school work.

We want your thoughts on how to make the woodworking or cabinet making department more educational in the training of boys. We don't care about the technical (or trade) side except as it may relate to the educational phase of the subject.

We believe that cabinet making is replete with possibilities for character building,—for mental and cultural development. We want you to tell us what you think of the idea—what you are doing or propose to do to emphasize the cultural side of cabinet making in the training of your boys.

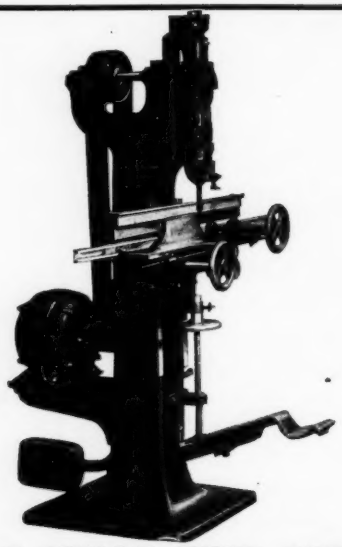
Every teacher who sends us 500 words or more on this subject will be rewarded for his endeavor. The best thoughts on the subject will be bound in book form and distributed broadly throughout the country. And essays considered worthy of entrance into this book will be awarded special cash prizes according to their merit to be established by a board of Judges, consisting of three men high in the vocational field.



Write for details

American Wood Working Machinery Co.

ROCHESTER, N. Y.



NO. 147 HOLLOW CHISEL MORTISER

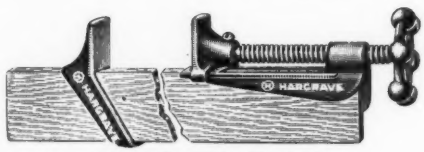
Especially adapted for Manual Training Schools, as it is simple to operate, has new type gauge and will mortise up to ¾". All parts are guarded and is arranged for direct motor drive. We shall be pleased to send complete information and also testimonials regarding this machine. Write for circular today, also copy of our Special Manual Training School Catalogue.

Hall & Brown Wood Working Machine Co.

Home Office and Factory
1913 to 1933 North Broadway
ST. LOUIS, U. S. A.

Standard Carriage Clamp

Perfection Steel Bar Clamp



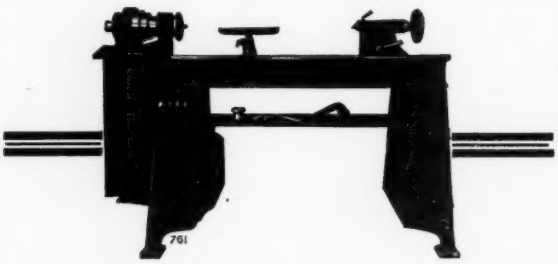
Clamp Fixture for Wood Bar

We manufacture a complete and up-to-date line of Clamps, ranging in size from 1 in. to 10 ft. opening, also many other improved mechanics' tools which should interest you. Write for our new catalog.

Ask your dealer for HARGRAVE QUALITY TOOLS

THE CINCINNATI TOOL CO.

Established 1879 — Waverly Ave. and C. L. & N. Ry.
Incorporated 1884 — CINCINNATI, OHIO



Designed for School Work

THE American High Speed Ball Bearing Lathe has been especially designed for the severe service of Industrial School use—having those three outstanding points so necessary for a school lathe—ruggedness, simplicity and unusual safety features.

Boards of Education and Industrial School Superintendents should investigate the "American" line of high quality saw benches, jointers, planers, band saws, wood-workers and other manual training machinery.

Write for complete specifications and description.

American Saw Mill Machinery Company
74 Main St. — Hackettstown, N. J.

AMERICAN
MANUAL TRAINING EQUIPMENT

When You Think of Supplies

For Your Sheet Metal Working Course

THINK OF

BERGER BROS. CO.

You don't have to shop around when you buy of us. We carry everything from a rivet to the largest machine used for this work.

Ask Any Sheet Metal Worker

If you are not equipped to teach this course you should investigate. The sheet metal industries need skilled labor and need it bad. The work is healthful, the hours short, and the wages high. Let us send you literature on the subject.

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Line of Tools and Machines

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WE OFFER you quality stains and finishes, exactly the same products that we furnish to furniture manufacturers.

OUR WATER STAINS are ideal for school use. They are clear and transparent, penetrating and permanent.

WRITE US for further information, and ask to have your name listed to receive

WOOD FINISHING BULLETINS.

You will find them helpful.

Drop us a postal now

Grand Rapids Woodfinishing Co.
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GRAND RAPIDS **MICHIGAN**

MARIETTA WOOD AND METAL FINISH SPECIALISTS

The finish should be your master stroke

MARIETTA SPARTAN ART WOOD **STAINS**

will give the final touch to the product of your hand and brain that insures satisfaction when looking it over or showing it to friends.

The Marietta Paint & Color Co.
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"Save the surface and you save all"—*Paint & Varnish*

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Because of the pressing need of a special type of instruction in physics for technical high schools, vocational schools and evening schools, we have arranged to publish a three-book series on INDUSTRIAL PHYSICS by Mr. L. Raymond Smith of the Wm. L. Dickinson High School, Jersey City, N. J.

Mr. Smith differentiates industrial physics from general physics. He says the subject matter of industrial physics must be more practical—closely in touch with the student's everyday interests and with his future work. It must emphasize the applications of physical laws.

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Instructor in Industrial Physics
Wm. L. Dickinson High School,
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226 pages 5½ x 8, 227 illustrations, $1.75 net, postpaid.

The book covers such topics as:—

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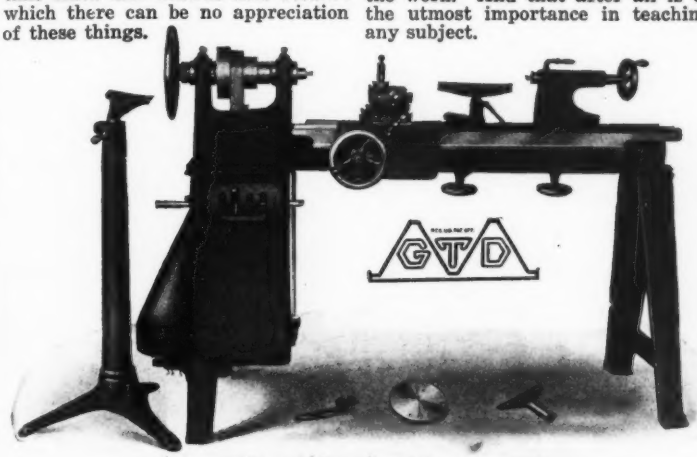

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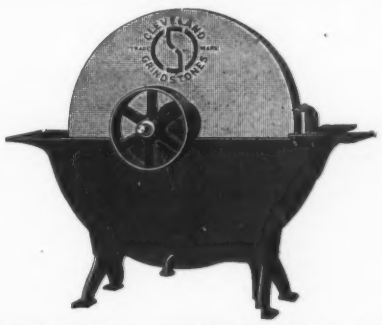

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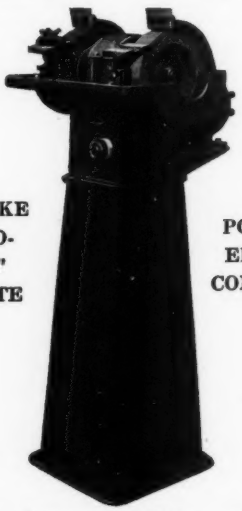

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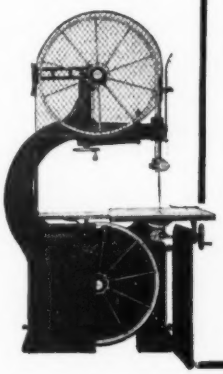

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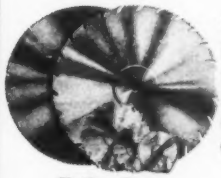

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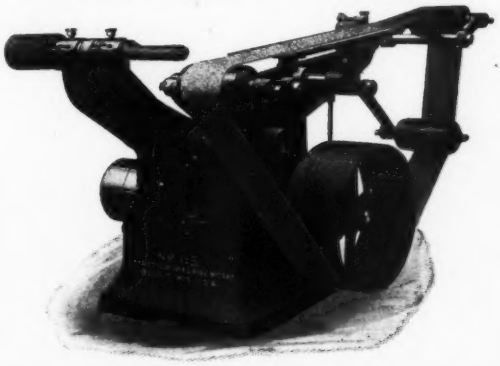

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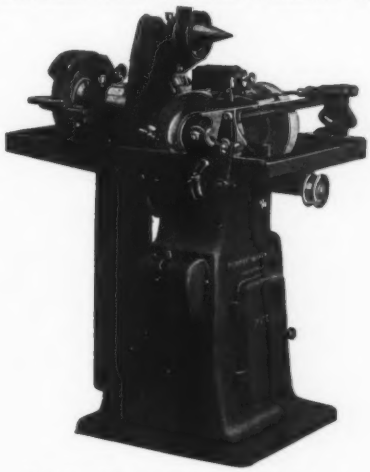

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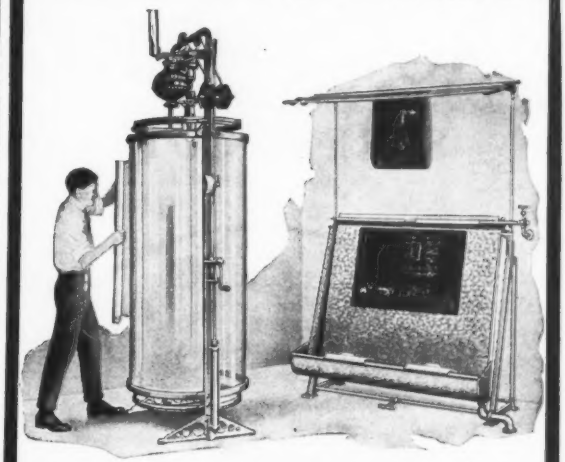

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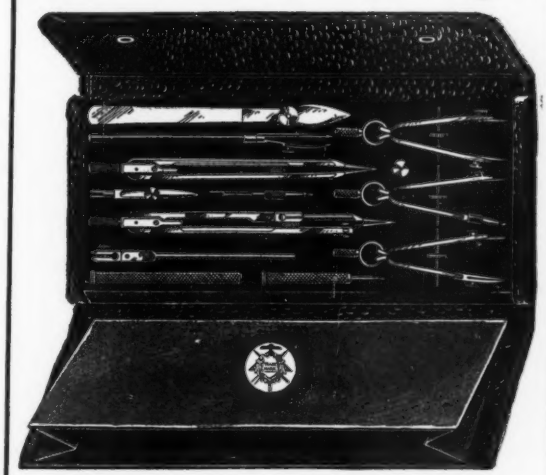

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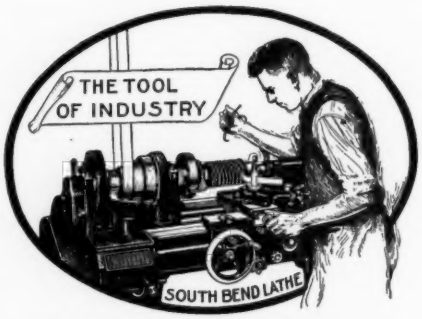

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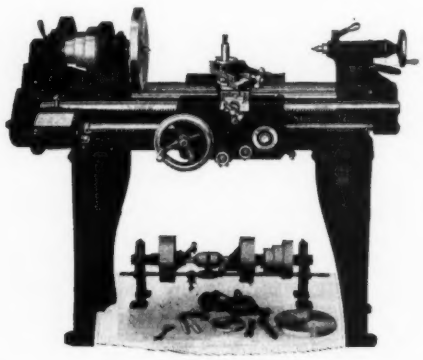

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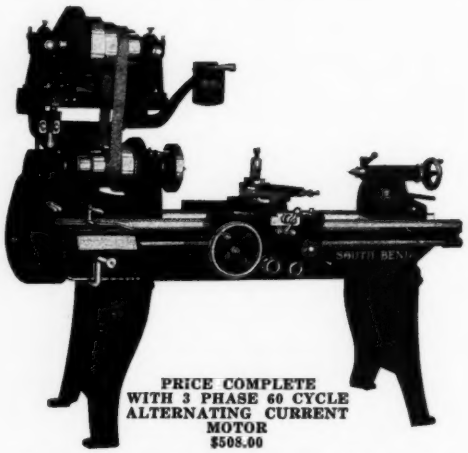

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The Board of Editors invites contributions of all kinds bearing upon the Industrial-Arts Education, Manual Training, Art Instruction, Domestic Science, and related subjects. Unless otherwise arranged for, manuscripts, drawings, projects, news articles, etc., should be sent to the Publication Office in Milwaukee, where proper disposition will be made. The Board of Editors meets each month, and all contributions submitted are given careful attention. Contributions when accepted are paid for at regular space rates. In all cases manuscripts should be accompanied by full return postage.

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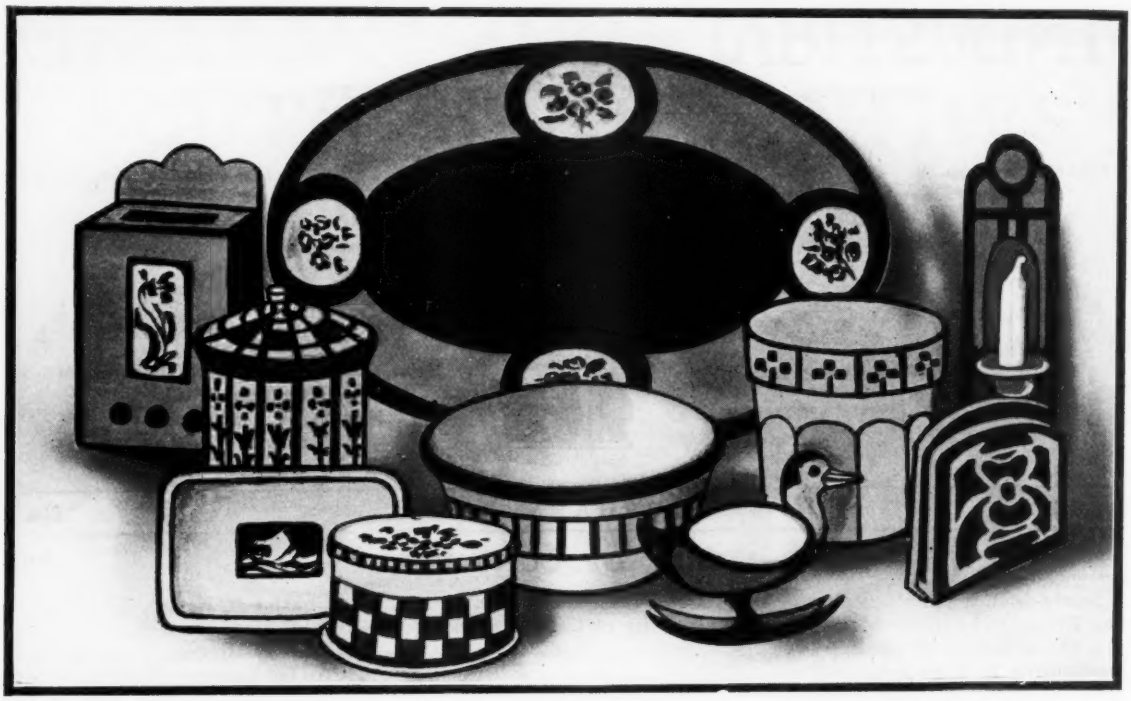

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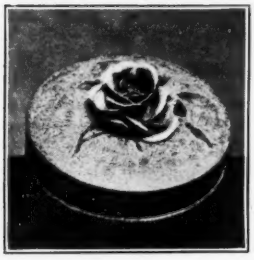

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INDUSTRIAL-ARTS MAGAZINE

Volume XII FEBRUARY, 1923 No. 2

A Study in Coordination Tests

Charles A. King, State Normal School, Plymouth, N. H.

IN this discussion of "Coordination Tests" we shall endeavor to show that it is possible to measure and evaluate motor or hand skill of children by methods similar to those used in the standard intelligence tests. It must be understood, at the outset, that these coordination tests are not intended to measure intelligence, but only to record the ability of the student to coordinate his mental and motor processes in giving motor expression to those thoughts which are capable of that mode of expression.

It is evident that no one test of the series can be considered final. The tests will serve the best purpose if they are given in each grade above the second and the records kept for comparison and for reference at any time when such data may be valuable. Annual testing makes it possible to note the progress and development of the mental trend of individual students and to check errors due to a temporary condition of the child. It also prevents the bias of any teacher or examiner from having undue influence in the conclusions.

Value of the Tests.

Coordination tests carried out carefully and continuously throughout the school life of a student will be of inestimable value to the officers in charge of vocational guidance. They will be an assurance that the consideration of the vocational potentialities of each student will be based upon the record he has made, instead of, to a greater or less extent, upon what the advisor has had for breakfast. If such tests are properly filed for permanent record, and are compared with conclusions based upon general intelligence and achievement tests, the vocational advising officer will have at hand an accumulation of information indicating whether the student should be headed toward mechanical work, or toward a business, scientific, professional or artistic career in life. These tests may be given to individuals or to groups as desired. Often students whose mental trend is obvious, and the quality of whose coordinations is well established, may be excused, but it will be found that in cases of children whose mental trend or quality is a matter of doubt, that these and similar tests furnish evidence which indicates the direction in which should lie their life activities. The normal child is not a serious problem to the vocational officer. It is the backward child, the child with marked tendencies, and the child with odd or unusual qualities of mind and peculiar modes of self expression which should not be judged with the mass. Such judgment may inflict a great injustice upon the child, and lead him into a path of life in which the nation will lose the products of his greatest efficiency.

What the Tests Embrace.

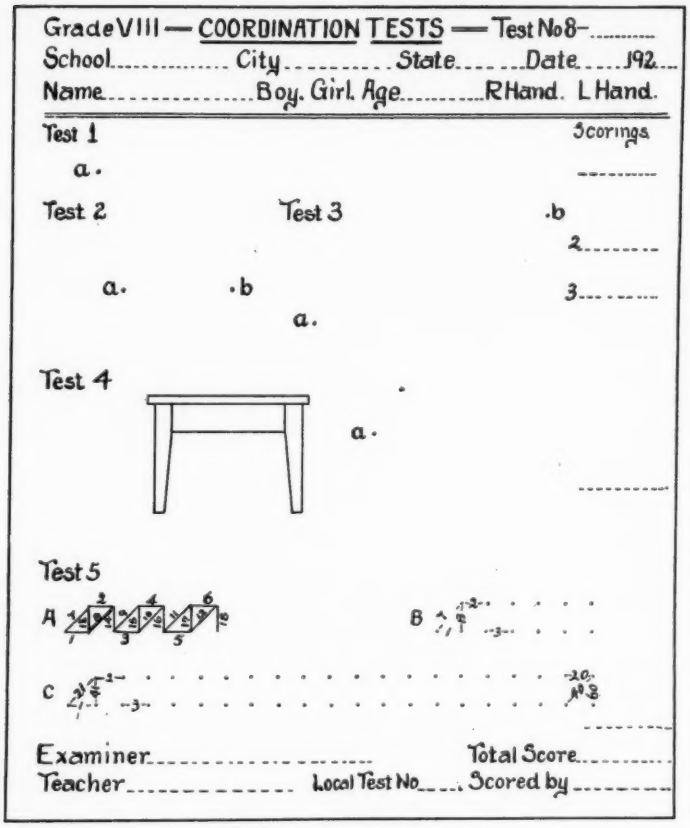
The tests consist of one sheet of five tests for each grade from the third to the eighth inclusive, one for the junior high school ages of 14-15, and one for the senior group, 16 years of age and older. The tests are based upon the fact that a pencil, or a substitute used as a pencil has ever been the primitive method of self expression, and the facility with which it is used indicates the natural ability or the mental trend of the child. Any one who cannot use a pencil to produce an intelligible graphic representation or interpretation of thought, involving simple form, lacks the degree of congenital endowment of those mental qualities and the motor reactions upon which the facility of the highly skilled workman is based. Such drawing is not intended to measure artistic ability, except as an incident. The tests purposely avoid so much as possible all allusion to artistic results, though the congenital endowment of motor skill of the future highly skilled workman and of the future artist are closely related.

The norm which results from these tests is expressed as the "Factor of Coordination," or F C, which is the median of the scores of all the students tested in each grade. The scoring of each individual or of each group may be compared with the group F C which will indicate the degree of facility in motor expression very much as I Q indicates the degree of intelligence. The highest F C is 10, the various group medians ranging between 5.3 and 6.3.

Results of Trial Tests.

In arriving at the norm or the F C, upon which the gradings were based, tests were made of the coordinations of 873 students, grouped in thirty nine classes averaging 22.38 students each, as follows;

Grade 3—Test IIII	121
Grade 4—Test IV	100
Grade 5—Test V	106
Grade 6—Test VI	126



BLANK USED FOR TEST VIII.

Grade 7—Test VII	126
Grade 8—Test VIII	138
Junior—Test Junior (J)	97
Senior—Test Senior (S)	64
	873

It is obviously impossible to arrive at authoritative conclusions from the number of students tested, but the results indicate the direction in which the conclusions would probably lie if several thousand unselected students were tested and scored; hence the results may be of interest. For example; in the comparison of the oldest and youngest students of the classes in the summary graphs and in the grand summary, we see that the average coordinations of the youngest are .54 of a point better than the average coordinations of the oldest. But as both are lower than the norms, or minus, the figures indicate that the coordinations of the youngest are not sufficiently developed to attain the norm, regardless of their scholarship. In most cases this will be remedied later. The lower intelligence of the older students who are in many cases retarded or deficient, results in a lower group F C and indicates less development of the coordinations than is attained by the normal students of the same grade.

The results of testing fifty left-handed students indicate that they are lower in the first four grades because they are in the stage of adapting themselves to a right-handed world. Those tested by the four higher tests earned a score enough higher than the F C to give the left handed group a score of plus .84 of a point above the F. C, or above the norm.

The comparison of the F C's of 453 boys and 420 girls with the norm gives the boys plus .7 of a point while the girl's average F C was minus 3.10 points.

Differences Between City and Country.

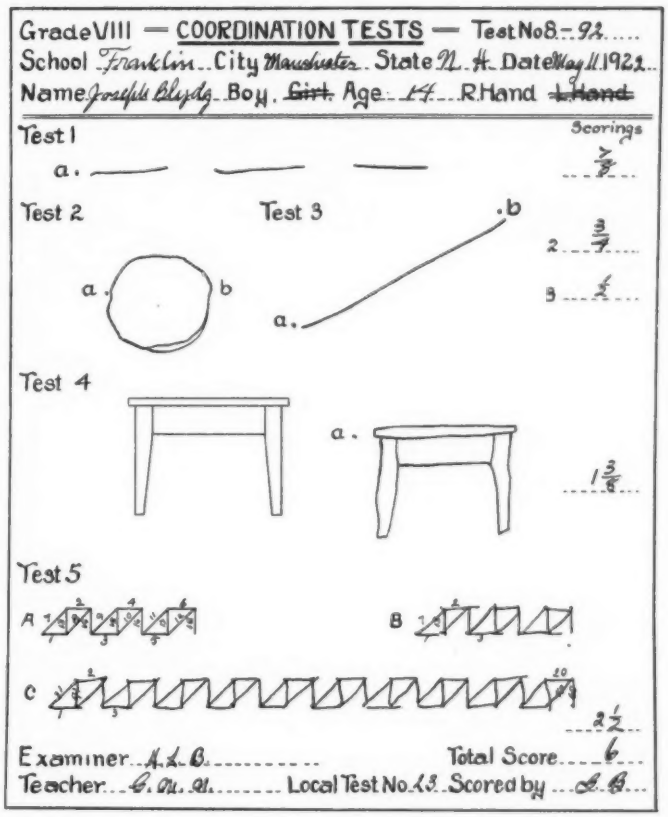
It will be noted in the grand summary that the median of the cities, compared with the F C and normal curve of the graphs, indicates plus .11 points, while the

TEST 8

Cities	Number Tested	Ages			Factors of Coordination								
		Youngest	Oldest	Average	Youngest	Oldest	Average	Lowest	Highest	Median	L Hand	Boys	Girls.
Manchester	23	13	16	13.10	6.1	7.	6.6	4.5	8.5	6.3	1	10	13
Concord	21	12.4	17	13.3	7.	5.9	6.5	3.9	7.9	6.7	3	21	0
Laconia	23	12.	16	13.3	5.2	5.4	6.1	4.3	9.3	6.	1	11	12
Plymouth	29	12.	17	14.2	5.6	4.	5.4	3.6	8.6	5.2	2	13	16
Madison	17	11.	15	13.5	5.8	5.7	6.2	4.	7.8	6.2	0	6	11
Winchester	20	11.5	15.10	12.9	5.	5.8	5.6	2.8	8.3	5.5	2	9	11
	133		Av	13.6							9	70	63
			Gen'l Av. FC		5.73	6.02					5.82	6.24	5.71
						Gr. Av	6.0	Gr. Med FC		6.0			

RESULTS OF TESTS GIVEN IN SIX NEW ENGLAND TOWNS.

country or town median indicates minus 1.97 points. It appears significant that the plus scorings of the cities were all in the first six tests, while the same tests in the towns and rural districts were all minus. The last two tests of the town showed a distinct improvement, leaving the curve heading upward, while the same tests in the cities resulted in a practically equivalent drop, leaving the curve pointing downward, though even then the cities led the towns and rural districts by more than two points. This is an evidence of the value of organized hand work in the city schools, while the sudden change, favorable to the town and rural schools suggests the value and emphasizes the importance of the home and social environment of the rural districts in the development of the child. The simultaneous dropping of the coordinations of the children of the city schools and their increase in the town and rural schools offers a field for investigation. Without doubt adolescent development has a bearing upon the problem, though the fact that it worked in opposite directions in the city and town schools, suggests the possibilities of interesting developments if the tests were carried out to the point of relative certainty by testing several thousand students in both environments.



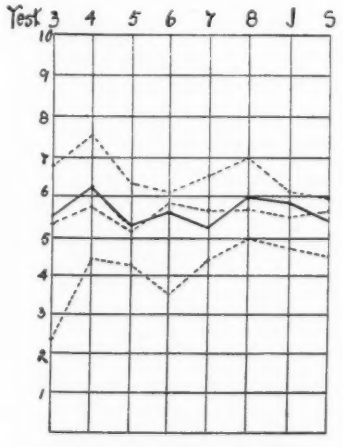
TEST VIII AS TURNED IN BY A 14-YEAR-OLD BOY.

To illustrate the character of the test sheets and the method of giving the tests, a blank test sheet, a filled test sheet and directions to the examiner for Grade VIII are printed below:

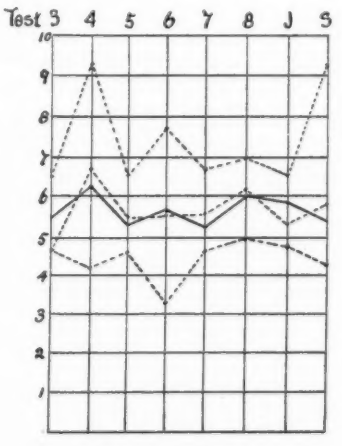
DIRECTIONS FOR GIVING TEST VIII.

Test 1. Draw three horizontal freehand lines 1″ long and 3/8″ apart, beginning at point a and extending to the right. Eye measurements only. Allow twenty seconds for the test.

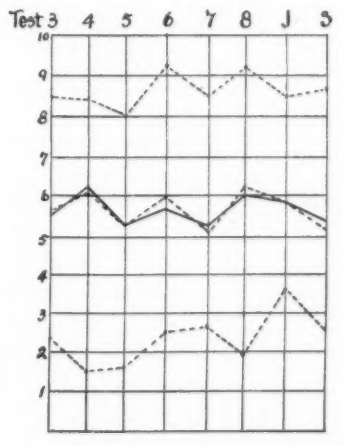
Test 2. Draw the most accurate freehand circle you can through points a b; first use light trail lines, then erase wrong lines and feel for the true circle. Strengthen the result lines. Allow 1½ minutes. At 80 seconds, "10 seconds to time." At 1½ minute, "Time."



GR. MED. FC: HIGHEST, LOWEST AND AVERAGE FC OF YOUNGEST IN ALL CLASSES.

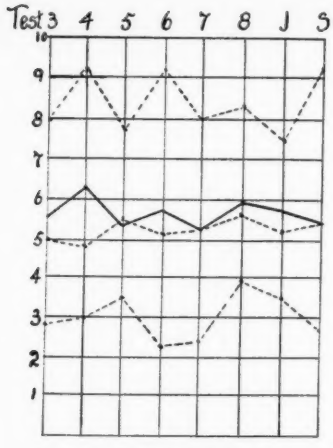


GR. MED. FC: HIGHEST, LOWEST AND AVERAGE FC OF OLDEST IN ALL CLASSES.

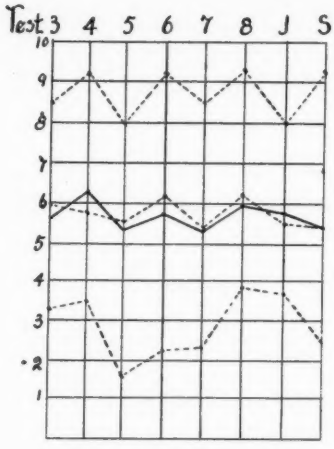


GR. MED. FC: HIGHEST, LOWEST AND AVERAGE FC OF 453 BOYS.

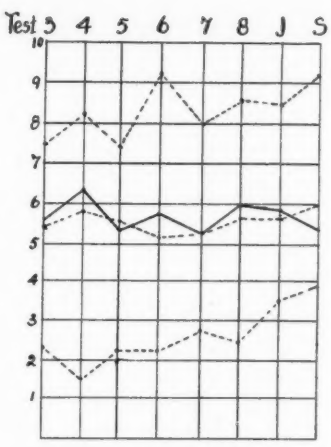
GRAPHS SHOWING RESULTS OF TESTS.



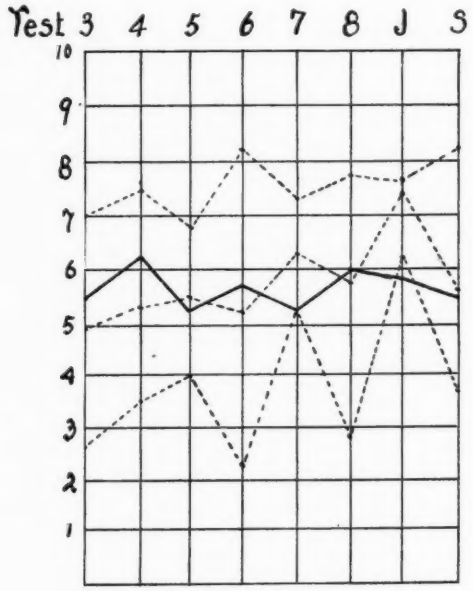
GR. MED. FC: HIGHEST, LOWEST AND AVERAGE FC OF 420 GIRLS.



GR. MED. FC: HIGHEST, LOWEST AND AVERAGE FC OF 418 CITY STUDENTS.



GR. MED. FC: HIGHEST, LOWEST AND AVERAGE FC OF 455 TOWN, VILLAGE AND RURAL STUDENTS.



GR. MED. FC: HIGHEST, LOWEST AND AVERAGE FC OF 50 LEFT-HANDED STUDENTS.

GRAND SUMMARY

Cities	Total by Cities	Test Number	Youngest +or− FC	Oldest +or− FC	Boys +or− FC	Girls +or− FC	Cities +or− FC	Rural +or− FC	L Hand +or− FC	L Hand Natural
Manchester	60	3	−.10	−.8	+.06	−.58	+.3	−.1	−.50	9
Concord	177	4	−.5	+.3	−.12	1.45	+.35	−.47	1.05	6
Laconia	181	5	−.11	+.04	+.03	+.20	+.6	−.14	+.20	7
Plymouth	195	6	+.08	−.24	+.2	−.60	+.3	−.5	−.45	10
Madison	115	7	+.57	+.20	−.16	+.1	+.26	−.25	+.	3
Winchester	145	8	−.27	+.02	+.24	−.29	+.3	−.4	−.18	9
	873	J	−.35	−.47	+.02	−.6	−.15	−.16	+.56	3
		S	+.37	+.48	−.2	+.04	−.85	+.8	+.18	3
Total +or− FC			1.01	−.47	+.7	3.10	1.11	1.94	+.84	50

SUMMARY OF RESULTS IN SIX NEW ENGLAND TOWNS.

Test 3. Draw the most accurate freehand line you can between the points a and b. Use light lines, erase and feel for the straight line which must be strengthened. Allow 1 minute; at 50 seconds, "10 seconds to time." At 1 minute, "Time."

Test 4. Make freehand copy of dimensions and form of bench, beginning at point a in space at right. Eye measurements only. Emphasize need of care in measuring and drawing. Highest degree of accuracy possible by eye measurement in given time is required. Allow two minutes. At 1¾ minutes, "15 seconds to time." At 2 minutes, "Time".

Test 5. Connect points as shown at A by horizontal, vertical and oblique lines, while 60 counts are made during one minute. Connect points in order mentioned above, in series, all horizontal lines first, then vertical lines, oblique lines last. One line is to be made as the examiner counts, no faster. If test is unfinished when 60 is counted it must be left as it is. Practise at B, the seconds counted to insure rythm. No erasing. Count to 20 for horizontal lines, 21 to 40 for vertical lines, 41 to 60 for oblique lines. Do not lose count when direction of line is changed. Explain change of direction before beginning test.

The ability to understand and to follow directions is evidenced by the readiness by which the various students grasp the examiner's explanations and carry them out. This is of the nature of intelligence tests and may be readily incorporated with these we are discussing. In giving these tests this was done and in places where it was possible to compare the results with the results of intelligence tests they were surprisingly close to each other. As this aspect of the tests is but an incident and space is limited it will not be discussed here.

The Group Productive Method in the Teaching of Cabinet Making

F. E. Hoffmeister, Hughes High School, Cincinnati, Ohio.

IN teaching any subject the aims and accomplishments expected should be kept clearly in mind before deciding on any plan of attack.

Let us consider for a moment what we are trying to teach in cabinet making. Probably every teacher of cabinet making will agree that it is not the purpose of a course in cabinet making to develop in the boys the extreme skill in the handling of tools which characterizes a cabinet maker, or to turn out boys who can take jobs side-by-side with cabinet makers and compete with them in the industrial world. It is generally accepted that the primary purpose of a course in cabinet making is to set up in the mind of the boy an appreciation of, and respect for, the contribution of the cabinet shops to civilization; an idea of the relationship of cabinet making to other industries; a knowledge of the source of materials and an opportunity to work with them; an understanding of the principles of cabinet making and a realization of the possibilities of cabinet work.

There are many plans for the teaching of cabinet making and it might be well at this point to consider several of the more prominent ones. One plan familiar to us all is that of having every boy in the class work on the same project, each boy doing his own individual piece of work and completing every detail himself. This plan is one that has been very popular with the teachers because of the ease with which a class is handled. The teacher needs only to concentrate on one job at a time, and he is enabled to give demonstrations and instruction to the class as a whole.

Let us consider this plan from an educational standpoint. By compelling a boy to make a certain object and not allowing him a voice in the selection of the project to be made, his interest is likely to be stifled somewhat. Three or four pieces of work a year will be the greatest number that a boy can be expected to finish. The boys as a result become familiar with very few types of work. If we are to teach cabinet making with any degree of success we should provide many types of work for the observation and participation of the boys.

The old method fails to give the boy an idea of how a piece of cabinet work is handled in an industrial plant where efficiency methods, such as the use of jigs and the specialization and division of work are used.

Another plan that is quite popular is to divide the class into two, three or four groups, each group working on a different project. Each boy works out all the details and completes his own piece of work. This plan is superior to the first plan discussed, because it provides for the observation and participation of the boys a greater number and variety of pieces of work. But this plan also fails, because it does not give the boy a complete idea of how the commercial plants handle the jobs. The wide use of jigs in this method is prohibited because of the waste of time in making them. It would hardly be profitable to make jigs to take two or three cuts on a machine. This method does not provide much of an opportunity for the boys to cooperate with each other and work toward a definite end as they will be expected to do when they leave school and take positions in the world.

A plan that is fast becoming popular is the group-method plan, using production methods. This plan more closely approaches our aims in cabinet making than either of the former plans discussed. As was pointed out in the aims in cabinet making, it is not the teacher's ambition to turn out boys highly skilled in the use of hand tools, but rather to give the boys an appreciation of cabinet making, a knowledge of the processes used in the cabinet shop, and a familiarity with efficient methods through the use of jigs and appliances and the organization of work.

Why, then, compel a boy to make a lot of abstract joints by hand, before putting him to work on a job, as is often done in the previously discussed plans? Is a boy in a cabinet shop first compelled to make a joint by hand, before he is put on a machine making joints, in order that he may get a proper appreciation of a good joint? He would no doubt get a better appreciation of a joint if he first saw one perfectly made on a machine. Will a boy get an accurate idea of the manner with which work is carried on in the industrial world by making a lot of joints by hand and completing every detail of a piece of cabinet work by himself is a question we must ask ourselves. Our time is too limited to indulge very much in such methods if we are to accomplish our aims. What, then, is the plan to be carried out to meet the ends of education?

First, the teacher should allow his boys so far as possible to select their own projects. If the boys are allowed to have a voice in the selection of the articles they are to make they are more likely to take an interest in their work. Three or four projects carried on at one time with the group production method are not too many. In fact, it is more desirable for several projects to be carried on at one time, because it provides for the better distribution of work, permits the use of the machinery to better advantage and provides plenty of jobs for the boys of the class.

A good plan for the selection of projects and the organization of groups is to ask every boy in the class

to hand in a slip of paper with a list of four or five articles, coming within certain limitations, which he desires to make. On going over the slips it is not a very difficult task for the teacher to organize three or four well-balanced groups from the data.

After the selection of articles has been made and suitable drawings or models to work from have been provided, the question of getting out the stock arises. In order to familiarize the boys with the method of the cabinet shops of making a stock bill it is well to have each boy make out a stock list of the piece of work he chose. It is not necessary to have all the boys make out stock lists but rather to delegate the task to one boy in each group.

In starting the movement of the different projects several boys of each group may be delegated to get out the stock, two boys put on the circular saw to cut the pieces to the rough width and length, two boys on the jointer to surface and joint the edges of the pieces, and two boys on the planer to plane the pieces to thickness. Several of the boys can be put on the job of gluing up taboret tops, table tops, etc. The group production method should provide for the organization and distribution of every job necessary for the completion of the projects. The suggestion was made that two boys be put on one machine or job. If the group production method is to be educational, provision must be made for the rotation of jobs. With two boys on a machine one boy acts as operator and the other boy acts as helper. As the operator becomes proficient in the use of one machine he can be transferred to another job as helper. The helper is then advanced to the job of operator and a new boy is assigned as his helper. In this manner the task of the teacher of training the boys for the different jobs is lightened. It is a recognized educational principle that a boy will learn by observation.

A boy acting as a helper to another boy on a machine will, if he is at all observant, recognize the essentials of the job. In the group production method we should keep in mind commercial standards and methods. Jigs, appliances and other means which will enable work to be turned out more quickly and accurately and which will result in a product that compares favorably with that turned out by industry, should be encouraged. This is an age of competition and the school is the place for a boy to learn the elements of efficiency.

Class discussions and demonstrations will, of course, have a place in the group method plan. Talks and discussions on topics such as lumbering methods, manufacture and use of glue, hardware, construction, design, the finishing of furniture, safety devices, and so on, form a vital part of the course and are indispensable.

In conclusion, let us sum up how the group production plan meets our aims.

1. First, it provides for the economical disposal of time. At best our time is rather limited, so it will be seen that this is a very important item.

2. More pieces and types of furniture will be made, thereby providing for a larger field of observation.

3. It affords an opportunity to have the boys work in cooperation with each other toward a definite end.

4. It gives the boys an insight of the methods of industry and an opportunity to learn some of the elements of efficiency.

5. Provision is made for bringing out the relation of cabinet making to other industries through talks and discussions.

6. Knowledge and use of a wide assortment of materials is obtained.

There are numerous other examples that could be enumerated, but the ones mentioned will convey a definite idea of the manner in which the group production method meets the aims of a course in cabinet making.

The Manufacture of Shellac

Rodney Brace, Homestead, Pa.

(Second Article)

From the consideration of an interesting life history we must turn to a discussion of the disposal of a great mass of unsightly branches which are removed from the trees by the natives and taken to the lac jobber or the factory. The process of manufacture begins at this point and throughout it presents almost as many unusual and interesting phases as did the life history of the lac insect.

The first step in the manufacture consists in breaking the branches into short and uniform lengths. These pieces are the Stick Lac which will be mentioned many times and which is to some extent an article of commerce. The stick lac is crushed, usually through an ordinary grain mill, and the resulting mixture is sifted and assorted into three parts. The first part consists of fragments of wood which are subsequently used for fuel. The second part is a fine dust which consists of the insect bodies and some resin. This mixture is known as Khud and is sold to the makers of bangles and toys. The third substance is a granular lac known to the trade as Seed Lac. The finer seed lac is sometimes sold as Grain Lac, though this latter term is but seldom used. Our interest is with this third material, though some mention will be made of the use to which khud is put.

The second important step in the process of manufacture is the washing, during which the seed lac is allowed to soak and is then washed in several waters

which carry off the purple claret colored dye and a powder like sediment. This sediment is called Gand and, like khud, is used for bracelets. The clear seed lac is held to continue the manufacture and the color in the water is condensed to make the dye. This washing process will be described in detail under the discussion of the dye.

Our seed lac is now ready for the process that finally makes it fit for our use. It is thoroughly dried and in the drying bleached to some extent. We find that it varies in color from pure black to a dark amber according to the trees upon which the insects fed. The best grades of lac are the more colorful ones, and the trade name, "Rangeen," meaning "full of color," is given to one of the very best grades. Yellow arsenic may be used to clear it and help to furnish a fine yellow color. Pine rosin is the most frequent adulterant and, while there are few grades entirely free from it, there is always a temptation to add too much of the rosin, which is cheaper than lac. A good product should contain no more than five per cent of rosin, but samples have been examined which contained as high as seventy per cent. This explains much of the shellac trouble which was experienced during the late war period.

The seed lac is put into a cylindrical bag but two inches in diameter and twenty or more feet in length. This bag is held before a charcoal fire by two persons, an operator and his assistant. The operator twists the bag in one direction by the means of a stick, held in one hand, while the assistant twists the opposite way. The heat melts the lac within the bag and, as it oozes out, the operator scrapes it off and it falls to the smooth stone floor. The operator is most expert in handling the melted lac. With a spatula-like instrument in his right hand he mixes it thoroughly until it is properly

ENGLISH 18TH CENTURY JARDINIERE—LACQUERED WOOD.
(In Metropolitan Museum, New York.)

FRENCH 18TH CENTURY SECRETAIRE (1780-1790)
OF LACQUERED WOOD.
(In Metropolitan Museum, New York.)

cooled and then signals to another assistant, who puts the semi-liquid mixture on a porcelain cylinder containing hot water. The mixture is spread evenly over this cylinder and is then cut carefully and removed. The sheet thus formed is warmed before a fire by the assistant who used his hands, his feet and his mouth to stretch it in every direction. Eventually he produces a sheet five feet long and six feet broad. These sheets are put aside to cool and to be examined for defects which are all punched out by hand. When these sheets are inspected, only the finest pieces are used for the shellac of commerce.

Some of the deeply colored lac is allowed to drop from the bag in pieces about one-half inch in diameter. These pieces are the Button Lac which we sometimes see, so named because of their shape. Another highly colored lac is made into dark red sheets and sold as Garnet Lac. The refuse from all these processes is sold to the makers of sealing wax and bangles.

Where machinery has been introduced to take the place of hands and to simplify many of the processes which were formerly carried on by native labor, the resulting product is not altogether satisfactory. Many purchasers demand the product of the earlier processes, insisting that that made by machinery lacks some of the value to which they are accustomed.

Lac Dye.

Discussion of lac would certainly not be complete without mention of the dye for which it is most widely known. Up to a few years ago lac dye was a most valuable export and an extensive industry had been built up to produce it. To this industry the discovery

of analine dyes was a great calamity for, instead of being a great source of income, it is almost impossible to dispose of the lac dye, and it is used for fertilizer or thrown away.

The red fluid which is present in the female cell before the young are hatched is the lac dye. After the young are allowed to depart the value of the stick lac for dye is lost and for this reason the twigs were gathered, in former times, before the hatching took place. The following passage on the "Lac Dye Process" will be found on page 280 of the Agricultural Ledger, 1901, No. 9, issued by the Imperial Government of India: "The process of extracting dye is somewhat peculiar. A woman stands in each tub on the wet seed lac, and steadying herself against the wall with her hands, turns her body violently to the right and the left so as to keep the seed lac in a continual state of friction against her feet and the sides of the tub. At intervals the tub is filled with water, on which the seed lac sinks to the bottom, while the dye rises to the surface and is skimmed off in shallow pans. This process is repeated at intervals until the lac dye has been completely extracted and the water poured into the tub shows no trace of color. A full day's work in scouring out the dye is estimated to produce a maund and a quarter (102 pounds) of seed lac from which the dye has been extracted. The dye, which is taken up in the form of colored water from the scouring tubs, is strained through coarse cloth on a gently sloping platform with a raised edge. Fragments of seed lac, wood and dirt that may have been taken up with the water out of the tubs, remain in the straining cloths, and this substance is subsequently dried and sold as Pank. The pure coloring matter, still held in solution in the water, runs slowly off the platform through a fine wire sieve, and flows in a slow current along a gradually descending series of zig-zag troughs to a well, the mouth of which is covered with a second sieve of still finer texture. While passing along these channels the sediment that has found its way through the straining cloths falls to the bottom of the troughs and a further deposit of sediment is left in the well. From the well the colored water is pumped into a large vat, and at the end of the day lime-water is poured in to precipitate the dye. By the next morning the dye has settled and is ready to be run out into boxes lined with cotton cloth and with small holes in their sides. From these the dye is transferred to compressible frames containing strong iron plates, and reduced by screw press to solid sheets of dark purple dye about a quarter of an inch thick. These are cut up into cakes and stored until dry for packing."

(The third and last article on shellac will appear in an early issue.)

Idealism in Manual Arts[1]

A. G. Bauersfeld, Supervisor of Technical Work in Chicago High Schools.

WE have often heard the old adage that "The history of the race is the history of the individual." The life history of any person is truly a record of the struggle between his real self and his ideal self. In all cases, the law ruling the world is the tension of the ideal and the real—the striving for unity, peace and harmony. The real gives the law of *truth,* and we affirm what a thing is; the ideal proclaims the law of *duty,* and we affirm what a thing out to be; having the unity of the two we announce the thing beautiful. *Self-realization* is the law of the individual, the school and the state.

What we need most nowadays is a quickened school conscience to urge us to take stock of the things we are doing, and by comparing and selecting, to determine the school practices that are really worth while. The school idea is not a fixed something, but a living, moving thing in the process of realizing of an ideal. In teaching, the true teacher lives in the life of the pupil. He is conscious of the value of each new experience and subject-matter under consideration in terms of the unfolding life of the pupil.

Therefore idealism in manual arts should be thought of in terms of group experience and of the experience of each individual. The things we are doing today in the shop and in the drawing room, may be thought of as an inheritance of the good things developed through years of experience, coupled with the aims of all those teachers who are striving to elevate our standards of practice.

A brief résumé of the manual arts movement in the United States will prove helpful in pointing out some of the mile stones of our progress in setting up and attaining ideals.

1. From the manual labor movement of 1839, recognition was given to the value of handwork pursued for vocational purposes, as being a valuable adjunct to academic learning.

2. From the Morell Land Grant of 1862 came the establishment of state universities where shop and drawing and agricultural training were established as being necessary for training engineers and specialists in the industrial and agricultural occupations.

3. In 1876, from the Russian system of mechanic arts, we learned that the fundamental principles and processes of any trade could be analyzed and arranged in logical order for class instructional purposes.

4. Next the introduction of the sloyd system of handwork, with its emphasis on individual instruction and the making of useful projects for the home, made possible the introduction of systematic courses of instruction for the grade schools.

[1]Abstract of a paper read before the Manual Arts Section of the Wisconsin Teachers' Association, November 10, 1922.

5. In the nineties, the stress upon the correlation of studies and the considering of racial epoch periods were educational movements which used the shop and drawing rooms to vitalize and supplement the regular book studies.

6. Next the art crafts movement taught us that construction must go hand in hand with beauty of form and design in order to give complete satisfaction.

7. The Federal Vocational Act has proven to be a blessing in the form of a court of inquisition, to teachers of manual training. The enthusiastic promoters of the Smith-Hughes bill for a time almost swept us off our feet. In order to meet the challenges hurled forth as to the educational values of our work, we were compelled to take an inventory of what we were accomplishing and to set up new standards of attainment.

8. Today, the tendency appears to me to be in the direction of building up a richer content for each subject taught in the manual arts group. Head training as well as hand training seems to be the new slogan. We have come to realize that there must necessarily be a distinction as to the degree of skill developed in the manual arts and the vocational courses. To train for skill is only a limited part of our job, the greater part being the task of directing the pupils to acquire a knowledge of shop processes and their application in the industrial world.

The foregoing statements indicate some of the changing ideals that have been set up as being worth while in the growing conception of the purpose of manual arts. What about the individual teacher? Must he not also have ideals which conform in part to the general plan of procedure, and in addition, be a guiding star for the development of his own personality as a man and as a teacher?

Perhaps the best lesson we have in the English language on idealism and its effect on the life history of a boy is that wonderful story of Hawthorne's, "The Great Stone Face." Do you recall how that simple cottage boy set up the wish and hope that some day he might be able to see the living embodiment of those benign, god-like features, which were ever before his eyes from dawn to sunset, far away high up in the hills at the other end of the valley? Instead of cold irresponsive piles of rock making the caricature of a human face, the boy Ernest saw a vision of one who was noble, kind, wise, patient and loving.

Do you remember how the demi-gods of the passing hour came back to the inhabitants of the valley and were heralded as men who fulfilled the prophesy of the Great Stone Face? But Ernest turned away each time from Mr. Gathergold, General Blood and Thunder, the orator, Old Stony Phiz, and finally even from the poet who wrote such inspiring thoughts set down in beautiful verse. The passing show of worldly men only affected Ernest for a few fleeting moments, but the silent communion of nature's wonder put its stamp on him through all those years from infancy to old age, till at last we have the declaration of the poet whose discernment of what is really beautiful points out Ernest as the living embodiment of the great ideal.

And so we see that idealism is an individual problem for each and every one of us. The obligation rests upon each man and each teacher to set up ideals and to strive to attain these standards of perfection.

In passing, permit me to pay a modest tribute to Wisconsin's great educational prophet, the man who labored so well for fifty long years for the betterment of your public schools. The manual training work throughout the length and breadth of this great country certainly owes much to Dr. Lorenzo Dow Harvey, who was not only a great thinker but a doer of many good deeds. All of us teachers are indeed grateful to honor the name of a man who devoted the last nineteen years of his life to building up a great vocational institution whose purpose and aim is to train real teachers of home economics and manual training.

To be true to our trust and to fight the good fight, we teachers must also set up ideals and work for them, just as that great leader did, who has gone before.

Have you ever attained your ideal year of school teaching? Of course you have not—neither have I. Do you set out each year to do so and then take stock at the close of the year to see what you have accomplished toward attaining that year? Did you then make comparisons with some other man whom you knew was doing a good job? Have you tried and tried each year to do a better job than the year before? If you have not, the probability is that you have been marking time, and perhaps your feet are slipping on the down grade.

About eighteen years ago, while visiting Mother Rollins, principal of the Phil Sheridan School, of Minneapolis, who was a top-notcher in those days in weaving and basketry for the grades, I was requested to drop in on her manual training teacher in the basement, and see what he was doing.

As a matter of courtesy, I did so, and expected to find the typical basement wood shop, which was so common in those days—barren and ugly walls, hacked up benches, and butchered wood, slapped together as misfit home projects. Much to my surprise, I discovered a hidden gold mine. There was an enthusiastic group of boys, surrounded by patent office models, ingenious toys, kites, boats, magazines, books, study chairs in a corner of the shop, general tool lockers, lumber rack, stain and varnish bench, mounted specimens on boards showing progressive steps of manufactured articles, and many other interesting objects. This man taught his boys to think, to get ideas from references, and to relate their shopwork to the industries of the world. The result was that this man's teaching and shopwork were among some of my ideals for a number of years after. Just as that man built up a fitting environment to use in training his pupils to think and to do, so also must each one of us strive so to do, in order to have proper working conditions to do ideal teaching.

A step toward ideal teaching of the manual arts is to use present-day textbooks and class notebooks as a background for the theory and for the industrial application of your shopwork. Don't wait until you write the ideal textbook. Perhaps that will be years ahead—why not use the best on the market in the meantime? Our plan in Chicago, of devoting fifteen minutes each day for textbook work, and for class discussions, has even shown that we are able to produce a higher grade of skill, because the boy becomes more intelligent on the "what and why" of his work. We are furnishing each shop with a set of 24 textbooks, to be used throughout the day.

The ideal teacher should subscribe for at least two good magazines each year. Spend a few postage stamps each month to have the latest books on your subject and on related subjects sent to you on approval. If the books are what you need, *buy them* and add that much to your stock in trade. If you happen to work out a new problem, send in a drawing of it to the shop problem section of your magazine—don't wait and let some other teacher beat you to it.

Every teacher should join and attend at least two teachers' organizations, not only for his own good, but for the good of the cause in general. The status of teachers in the United States is now from fifty to seventy per cent better than it was 25 years ago.

Cooperation and the raising of standards through the joint efforts of these organizations is the answer. Don't complain and cease to become interested if the discussions at these teachers' meetings are too general, too philosophical and too idealistic. The teacher-training classes are the places to discuss and agonize over shop problems like: "How to find out the best way to plane a board square," etc. It is the inspiration and enthusiasm you need from original thinkers that will broaden your horizon and take your nose from the grindstone.

It is well worth a hundred dollars a year of your own hard earned money to take a few days off and attend a convention in some other city. You will have a chance to observe school work under different working conditions and study other plans of procedure. Furthermore, you will form acquaintances and friendships with the "comers on" and the leaders in the work that will help you in the years to come. How many of you are there who have heard Charles A. Prosser give an inspirational talk on vocational education, when he is at his best and "hitting on all six cylinders"? If you have, I am sure that you will agree that his message comes back to you again and again during the succeeding days of toil and plodding.

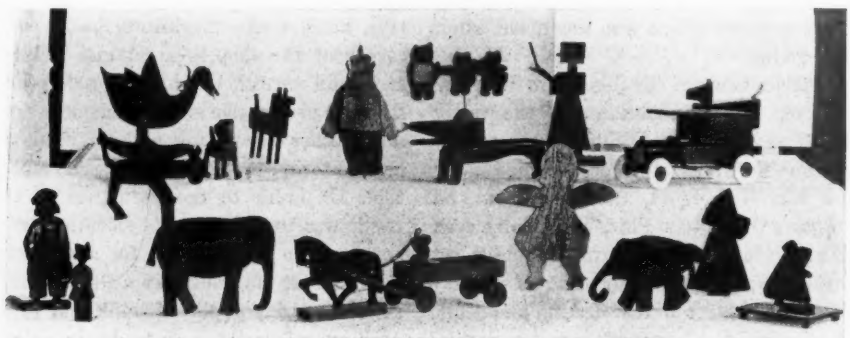
Professional growth, through study; this can be done by taking extension and summer session college courses, carried through a number of years which culminate in a university degree. This should be one of the aims of all teachers of manual arts.

Service to the community, outside of school hours, is an obligation that every teacher should keep in mind. He who drops his pick and shovel and crawls into a hole at the sound of the closing bell, is a slacker to the cause in general. Give a helping hand to the school activities; mix with the business men's organizations, club together on some recreative hobby—all of these will make you a very busy man and also a valuable member to society at large. The returns from such investments mean prosperity for the school and for yourself.

No true manual arts teacher should get the obsession that there are no new fields in our work which can be discovered and explored. The viking days of explorations and adventure still lie before us.

To make our work more serviceable we need to know a lot more about child nature the way children learn and acquire knowledge and skill. We also can improve the efficiency of our work through standardized tests on trade knowledge and skill; through time and motion studies; through related subject-matter—English, shop mathematics, etc.; through vocational guidance and placement.

Who are the men among us who will take up the task and work for the betterment of all? If there are any, let them gird their loins and begin at once, for the harvest is great and the workers are few.



Paint Shop Varnish Practice

Ralph G. Waring, Syracuse, N. Y.

(Concluded from January)

TO the inexperienced, it is generally a difficult matter to know where to start any staining, shellacing, varnishing or painting work. If, however, one goes according to the following rule, good work should result.

Start with the part which you see the least; end with that which you see the most.

With this idea in mind carefully study the progressive views of Plate 4.

First, notice the position of the chair in regard to the angle of light, which should always be at the back of the operator, otherwise there will be skips, or bad work resulting from too much light in the operator's eyes.

Second, study the holding of the brush. All work of this type should confine its movements to the fingers if possible, certainly not beyond the wrist; and never as a full arm stroke. The brush handle is shaped with a definite purpose in view and should not be worked as though it were a stick.

Third, all inside and outside work on the lower frame of the chair should be done complete, reversing side positions whenever necessary. The back should then follow as in Fig. 3. Note the lightness of the brush strokes and the fact that they start from each end of the spindle and stop near the center. The bottom rail and head rails are done last.

Fourth, the chair is grasped by the seat and stood on its feet; the head rail done first, the spindle faces second and the seat and edges last. The whole chair should then be carefully inspected for sags, runs or skips, and if necessary touched where needed. By placing the palm and extended fingers beneath the underside of the chair seat, the chair may be lifted and set down upon the floor. If too heavy for this method, some form of heavy wire hook should be devised whereby it may be thrust between the spindles and caught on the under side of the head rail.

Let us now consider a more pretentious piece, as for example a panel desk. The inside work should be done first, of course. However, for photographic purposes, it is necessary to start with an outside panel. Whenever possible this work should be done on a turn table; although the short saw horses and cleated platform do very well.

To start the work, the brush should be well filled with varnish and the panel line run from right to left as shown. The student should be very careful to see that all portions are carefully brushed in. With another brushful work rapidly and coarsely *across* the panel, bringing the strokes to the center of the panel from right and left. Wipe out the brush on the strike-wire and with a *light tipping* off stroke smooth out the varnish working to the center from top and bottom of the panel.

Next brush in the top rail and then the lower cross rail. Finish with both faces of the legs and start with the next panel, changing the work so as to bring the light upon the panel being varnished. All this work is done very quickly to give the varnish a chance to "flow out" and should not be done in a fussy or slow manner.

Set the desk upon the floor and lay on a cross stroke across the right end. Then with a full brush, work from the raw portions to the varnished work, using a left to right stroke with a fair pressure, as shown. Completely cover the top, then hold the brush perpendicularly and "spat" the sides against the edges of the top, using a final light running, "tip off" stroke

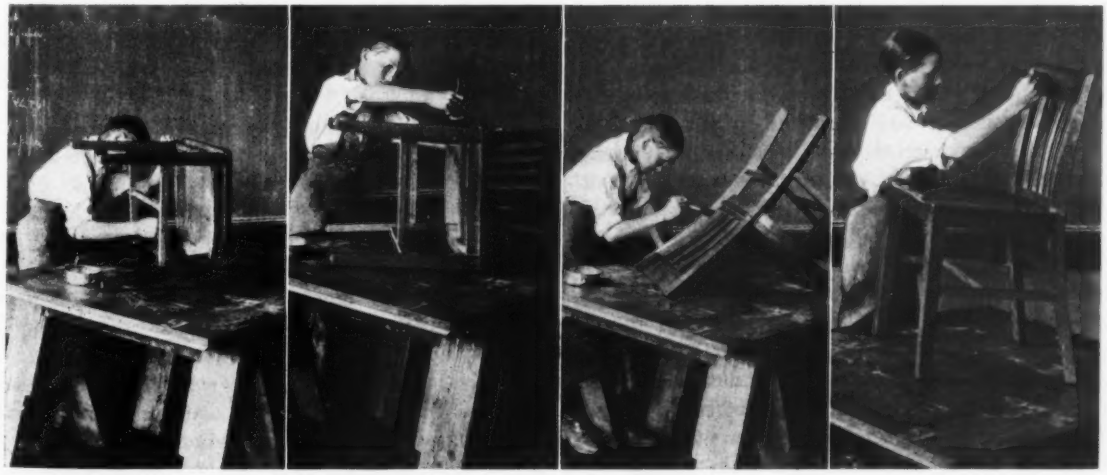


Fig. 1. Fig. 2. Fig. 3. Fig. 4.

PLATE 4.

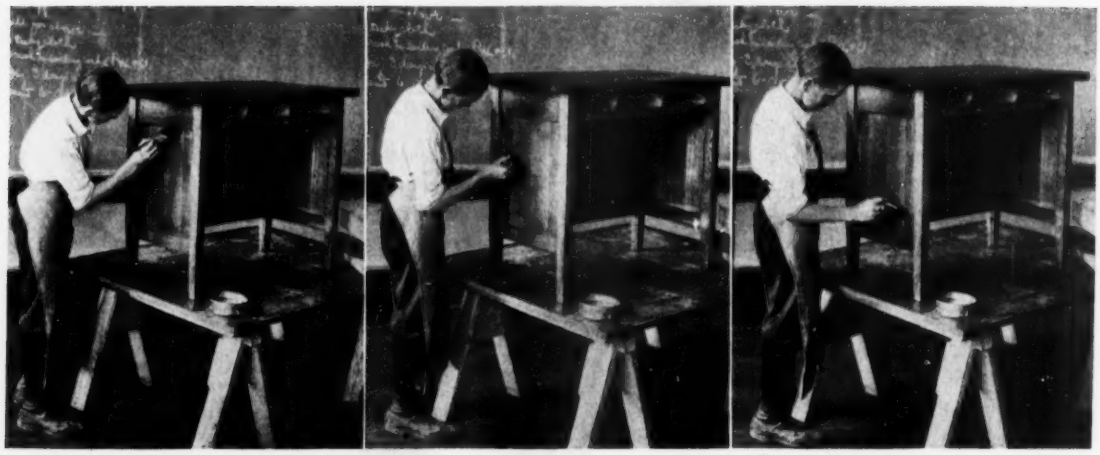


Fig. 1. Fig. 2. Fig. 3.

PLATE 5.

to remove the bubbles. Wipe out all surplus varnish on the strike-wire and very lightly tip off the entire top working from the center to the ends to avoid causing sags or drips on the ends. Learn to work with a fast, light and sure stroke.

In flat work of this type it is often necessary to "pick" the varnish. I have tried to photograph this operation, but several important features fail to "register" properly. The only apparatus necessary is a match stick sharpened to a very long and hair-like point. I have found that it pays to buy a box of "applicators" at the drug store for this work, since several thousand tiny rods of white pine 3/32″x6″ can be bought for half a dollar. When properly sharpened these are ideal for the purpose, the convenience being worth many times the price asked, especially when the method is being taught in the classes.

When the picking stick is properly sharpened, tiny flecks of lint or dust may be quickly lifted before the varnish sets, thereby allowing the varnish to flow together again. If these are not removed they will cause small mounds of varnish to collect and when the rest of the work is ready to sand or rub, these thicker and softer portions will pull out and leave a small hole and, if numerous, will cause a pitted appearance on the rubbed surface. This has become standard practice in piano, automobile and furniture departments and should, therefore, receive careful consideration, although I have found several types of methods in vogue in different sections of the United States.

At this time, it is well to consider a few of the requirements of a varnish and its suitability for different classes of work.

A good varnish must have enough "body" to make a film of practical thickness; it should dry evenly throughout its thickness to a firm film of high luster, indicating sufficient gum, and yet not so heavy as to drag beneath the brush or fail to flow out evenly. It should have enough first-class oil to make it flexible and thereby insure against premature cracking and silking.

It should be tested for paleness by enclosing it in a quarter inch by three inch test tube and comparing it with known standard samples (as Pratt & Lambert's No. 61), when held toward the light. By leaving a very small air space beneath the cork, the viscosity or body of the varnish may be tested by quickly inverting the tubes and noting the comparative speed with which the bubbles rise. The tubes should first be warmed for one minute under the closed armpit and then when testing, the varnish with the heaviest body will have the slowest moving bubble. Generally speaking, a heavy bodied varnish will produce a thicker film than one not so viscous, and when the fact that the average single coat of dried varnish is but 1/500 inch in thickness, it is of some value to consider the question of body.

When applied to dried, clean maple panels, filled with drop black ground in japan and thinned with turps, the varnishes should be tested for sanding qualities after three days. Use a split 6-0 paper. The proper quality of varnish should sand freely and clean in tiny rolls, with entire absence of resinous dust, indicating a cheaper, inferior grade. By immersing the two panels half of their length in water their durability under exposure will be determined by the fact that inferior or cheap varnishes will whiten under this treatment.

Generally speaking, I have found after considerable experience in specification writing, checked up by adequate intervals of time, that it is best to use a high grade "floor varnish" than to use a cabinet rubbing and a cabinet polishing as is so often done. Careful technical study has convinced me that the practice is responsible for the early silking-checking of piano finishes. The polishing varnish is harder and contains less oil than does the softer rubbing stock and because of its *greater inflexibility* is less able to properly expand and contract and therefore cracks and checks under the strains of expansion and contraction.

Trade terms indicating varnish troubles are often heard or seen but generally little understood.

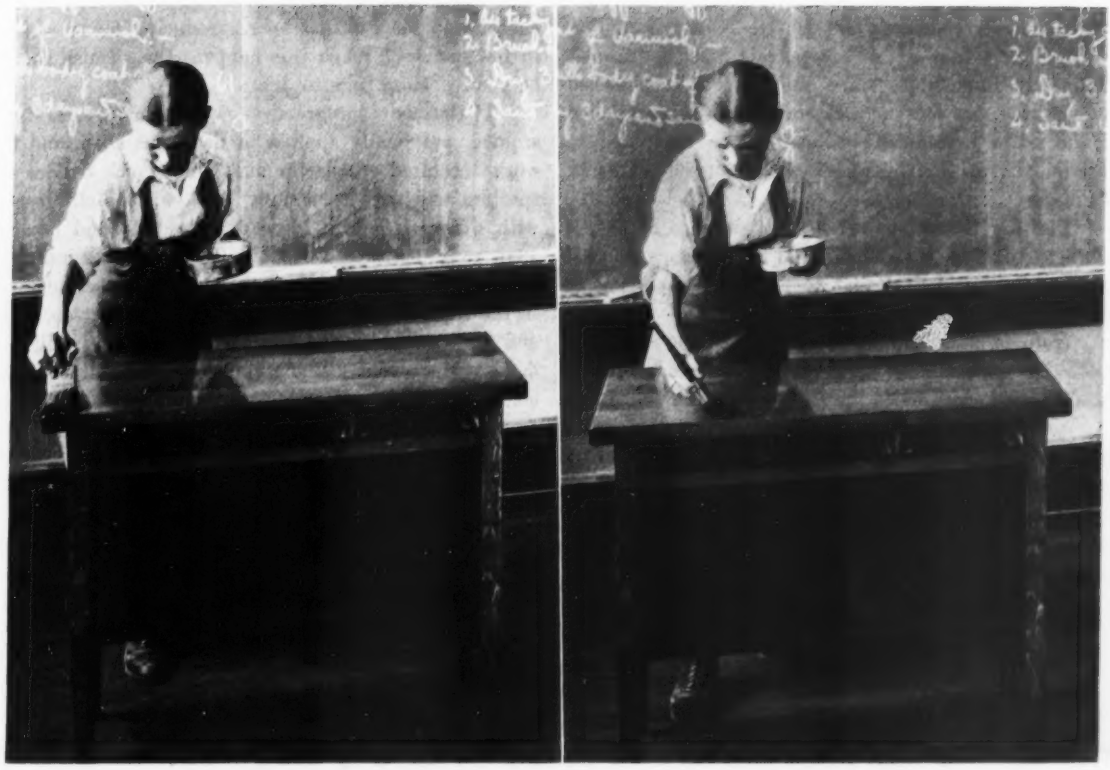


Fig. 4. Fig. 5.

PLATE 5.

(1) *Blotching* or *pinholing* results from overheating the varnish room, thereby causing the thinner to come out of the filler coat; or from improperly reducing the varnish with turpentine or other thinners; or by varnishing over a cold surface and afterwards increasing the room temperature. It is frequently caused by applying varnish over a surface which has been sanded in oil, a practice responsible for thousands of dollars of damage in factories each year. It consists in sanding the work between varnish coats, by dipping the sandpaper into a turpentine substitute oil and then sanding the varnish coat. In spite of all precautions, continued experience proves that it is virtually impossible to remove all this oil, with the result that trouble is bound to occur. It should be heartily condemned.

(2) *Bubbling* is caused by using a brush from which turpentine or other cleaner has not been removed, or by brushing a warm varnish too quickly or too long.

(3) *Brush marks* are caused by working too long with a brush after the varnish begins to "set," or by using too small a brush for the size of the work.

(4) *Blooming* is most likely to happen with a quick drying varnish which does not carry oil enough to resist various fumes and gases; or in an improperly compounded varnish; or during moist air when the oils and dirt from cleaning or polishing compounds produce a bluish film.

(5) *Brittleness* occurs when a varnish shows white marks when scratched by the heels on a floor, for instance. It is indicative of cheap rosin varnishes containing too much drier; generally are hard to apply and have little or no endurance.

(6) *Checking or cracking* occur under extreme variation in temperatures, or when a hard and inflexible "polishing" varnish is applied over a softer "rubbing" varnish. Exposure to ammonia fumes, as in a stable, or to coal gas, as from a gas heater, or furnace, will also break down a varnish film with great rapidity.

(7) *Chipping or flaking* is the result of using a cheap inflexible varnish for the under coats and better varnishes for the surface coats. Improper drying between coats will also cause the same effects when cold or dampness occur after application of the varnish.

(8) *Chilling* a varnish will cause it to become "seedy" or be full of small flecks of precipitated gum. Sometimes careful warming for a day or two will restore the quality of the varnish but should nevertheless be carefully strained.

Drying and hardening. Varnish to dry properly requires heat 78°F., light and sufficient air free from drafts. Very hot weather, cold weather, or excessive humidity all interfere with proper drying. A varnish of the oil type, does not harden after its initial "set" by evaporation of its thinner, but by a chemical process known as oxidation, hence a sufficient and constantly circulating air supply is invaluable.

Drying from the bottom up implies that a varnish properly compounded dries evenly and completely

throughout its thickness and is free from "skimming over." Taken literally, of course, this first condition is technically impossible, since the oxygen is absorbed through the exposed surface, but the term, as applied in the trade, is radically different from that used to describe the method by which boiled linseed oil dries, for instance.

Flatting is used to denote the presence of a spot having less gloss than the remaining surface, or the application of a dull varnish to produce the absence of gloss.

Holiday is a popular term to describe a missed spot. No work is done on a holiday, neither is it done on a skipped spot, hence the significance.

Sagging and fatty edges are produced by laying on an inadequately brushed heavy coat; or by dragging a loaded brush across an edge, thereby causing the varnish to pile up in a narrow ridge. Both are to be constantly guarded against.

Sweating of varnish occurs when the top coat is rubbed too soon or too long, producing shiny streaks in the surface. When this happens the varnish should be allowed more time to dry.

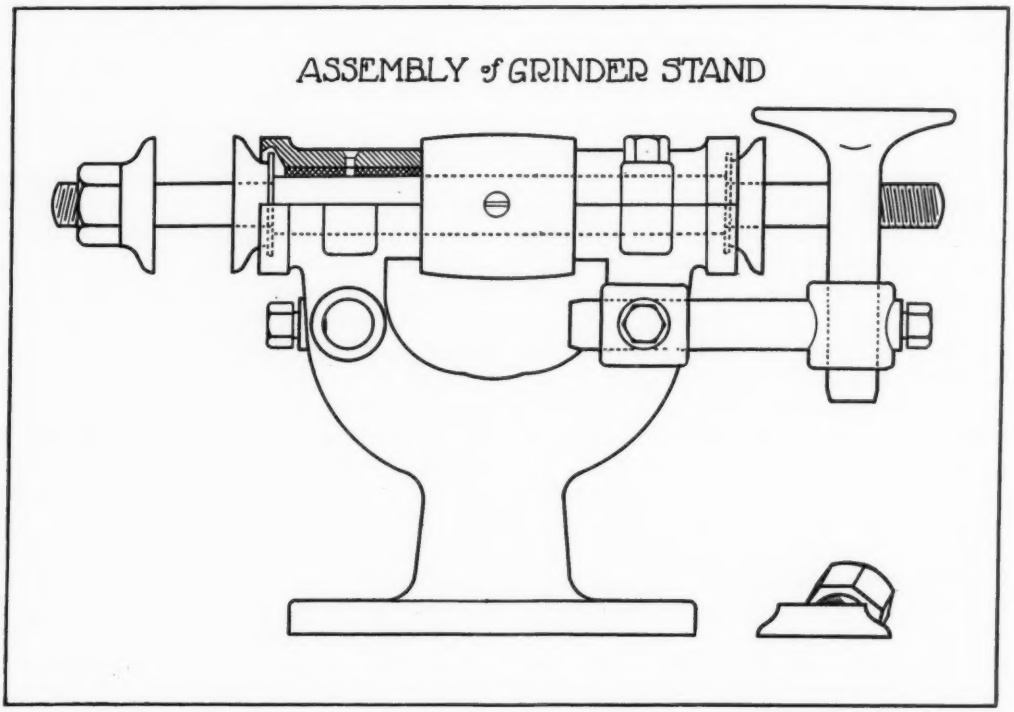
If the above progressive instructions are carefully studied, practically applied in the paint shop, and the work organized on the foreman plan, much tedious inspection and time consuming work will be eliminated, with a corresponding increase in output and quality. Plan your instruction so as to avoid all "fussiness" or old-maidish tendencies, as they will not be tolerated in the trade factory. Teach cleanliness of person, tools, and work, otherwise production and quality will fall down. Make your explanations clear, your illustrations complete. Know what you are teaching, practice the operation thoroughly yourself; don't bluff with your classes. It isn't safe. Too many have fathers who are first-class mechanics in the paint or varnish trades. Watch your step.

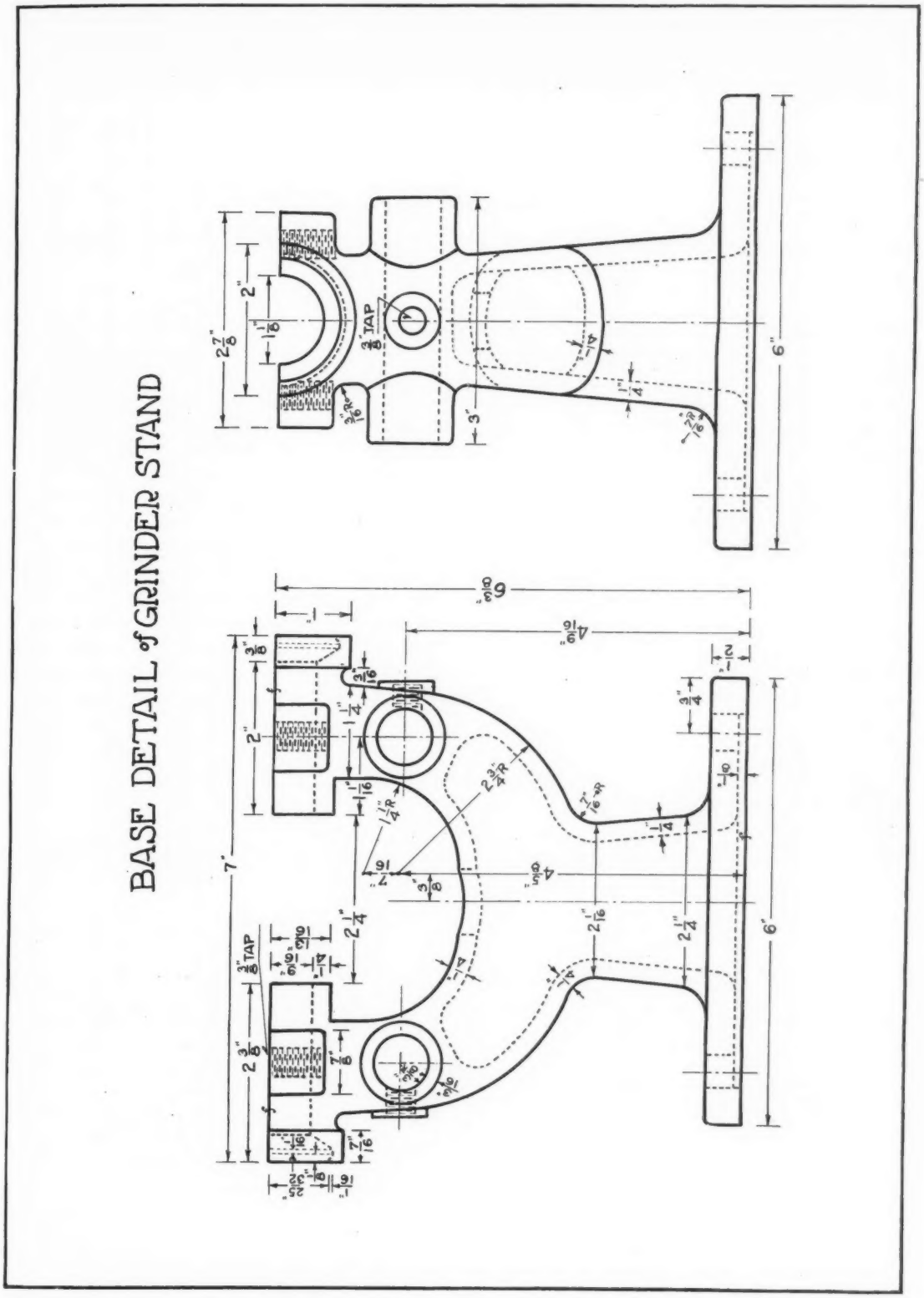
In our next article the subject of "Paint Shop Rubbing Practice" will terminate the series.

A Grinder Stand as a Project in Elementary Machine Shop Practice

Robert S. Condon, Decatur, Ill.

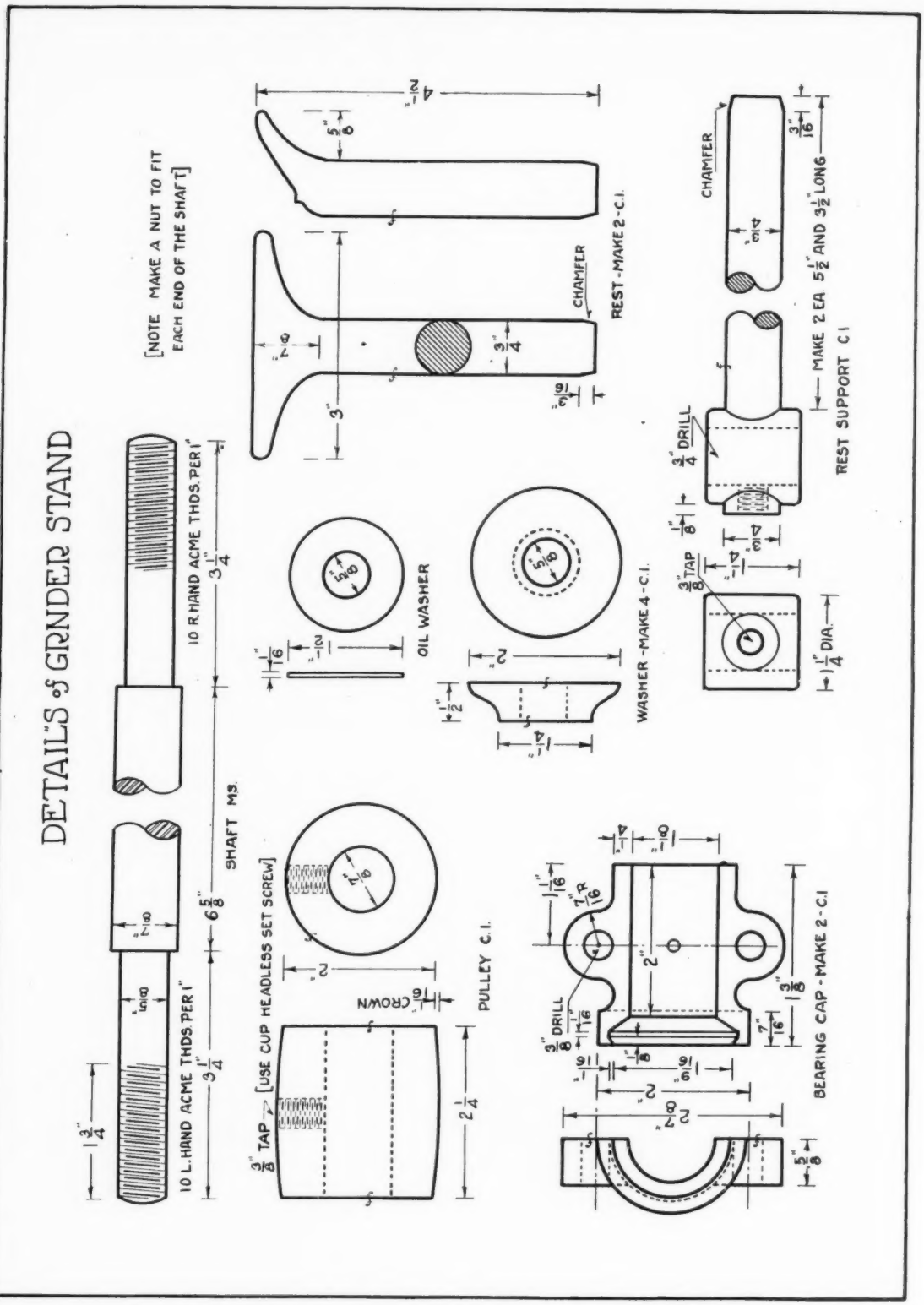
THE power grinder is a machine tool of recognized utility for any school or student shop. An effort has been made to design a bench grinder that will serve for heavy duty and that will be simple in construction. The necessary machining processes in the manufacture of the bench grinder, shown in the accompanying drawings, are very simple in character. The cutting of the acme threads on each end of the shaft may be displaced by standard U. S. threads and the U. S. S. nut, which can be purchased locally, may be used. Thus the instructor may avoid the necessity of threading a blank nut. But, in this case, care must be taken to key the washer on the left-hand end of the shaft. This





project might be accomplished by a class in a shop which does not boast a shaper in its equipment, because the truing of the bearing to fit the bearing cap, and the straightening of the base, can be accomplished with a hand file.

The pattern of the base of the grinder stand is



split along the center line of the side view. A core will be needed to cast the lower part of the base hollow. One core print will occur at the bottom of the base and the other core print of this core will be placed in the middle of the fork of the stand. The opening for the bearings will necessitate two small cores, the core prints projecting out in the position held by the shaft.

A washer 1/16" thick and 1½" in diameter is

placed against the shoulder of the shaft to prevent the oil which runs out of the bearing from getting on the revolving stone and being thrown upon the operator. The hood over the end of the bearing prevents chips of the stone from getting into the bearing. After the babbitt is poured a large X should be incised in the babbitt of the cap, with the intersection of the lines at the oil hole, to insure a good distribution of the lubricant over the bearing. A small oil cup or grease cup is an excellent addition to the grinder stand.

It will be noticed that the headless cup set screw that holds the pulley rigid to the shaft also prevents the shaft from slipping sidewise. So, it is recommended that a shallow hole be drilled in the shaft and that this set screw be fitted into it.

Cement Work as a Therapeutic Occupation for Men

Louis J. Haas.

(Continued from January)

PLATE 10 shows the parts necessary to construct the cement bird bath whose contour is shown in dotted line upon the cement stock section (see Drawing "e"). First, a galvanized iron dome was made and drilled to receive the hard wood striking shaft. For this dome the lid of a large ash can was used. A number of strips of No. 22 gauge galvanized iron were soldered into place inside this dome, to give the cement something to adhere to. The striking shaft was turned out of maple and then set in place, the reinforcing rods inserted in the holes drilled in the lower part of this shaft, to receive them. The dome with the shaft in place was then inverted, leveled, and filled with a 3 to 1 mixture, which was allowed to set, and then carefully cured; this completed the core. A core ring was made of three layers of wood laid so as to have the grain crossing in three directions (see Drawing "b"), with a brace across the middle, and openings left on either side to receive the supporting key. A one-inch hole was drilled in the cross brace by which the ring was centered upon the driving spindle of the turning mill. The ring was finally faced with a ring of No. 22 gauge galvanized iron. A templet was made of No. 18 gauge galvanized iron, according to the dimensions shown in Drawing "c," finally a retaining wall of No. 22 gauge galvanized iron was made as shown in Drawing "d" and all the necessary parts were completed. In assembling the parts preparatory to turning the bird-bath tamping and turning the cement, the procedure is similar to that described above. This is shown clearly by the drawing "e," Plate No. 10. When the bird-bath is removed

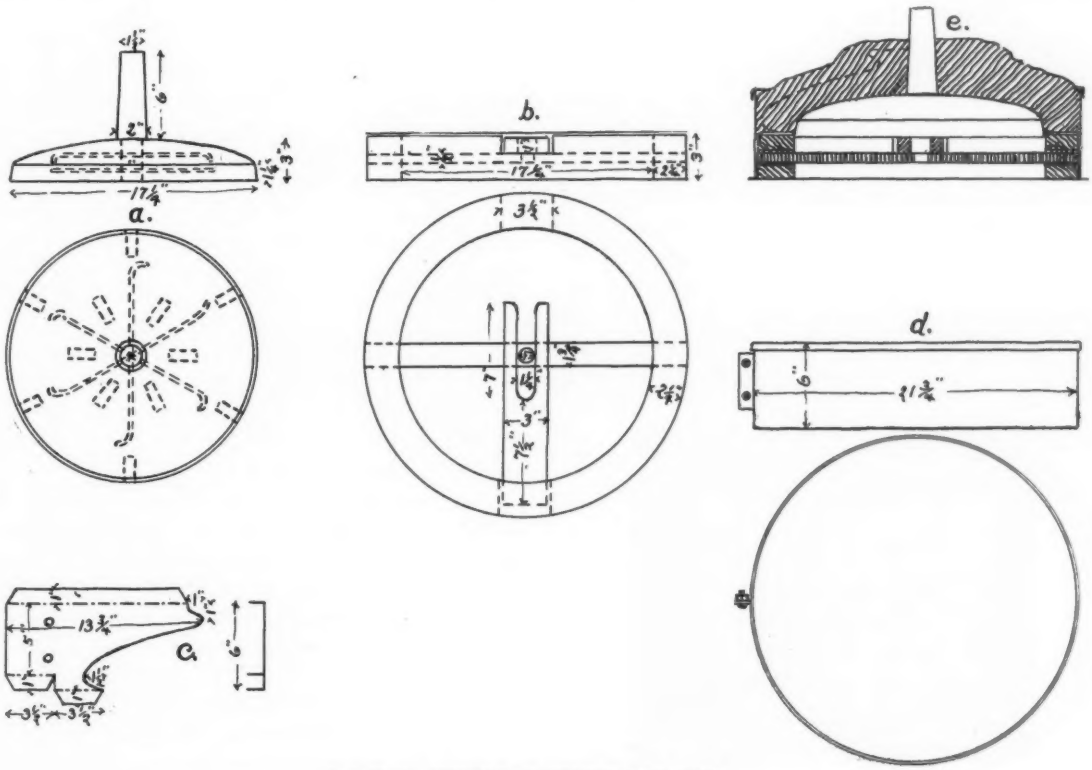


PLATE 10. DETAILS OF CEMENT BIRD BATH.

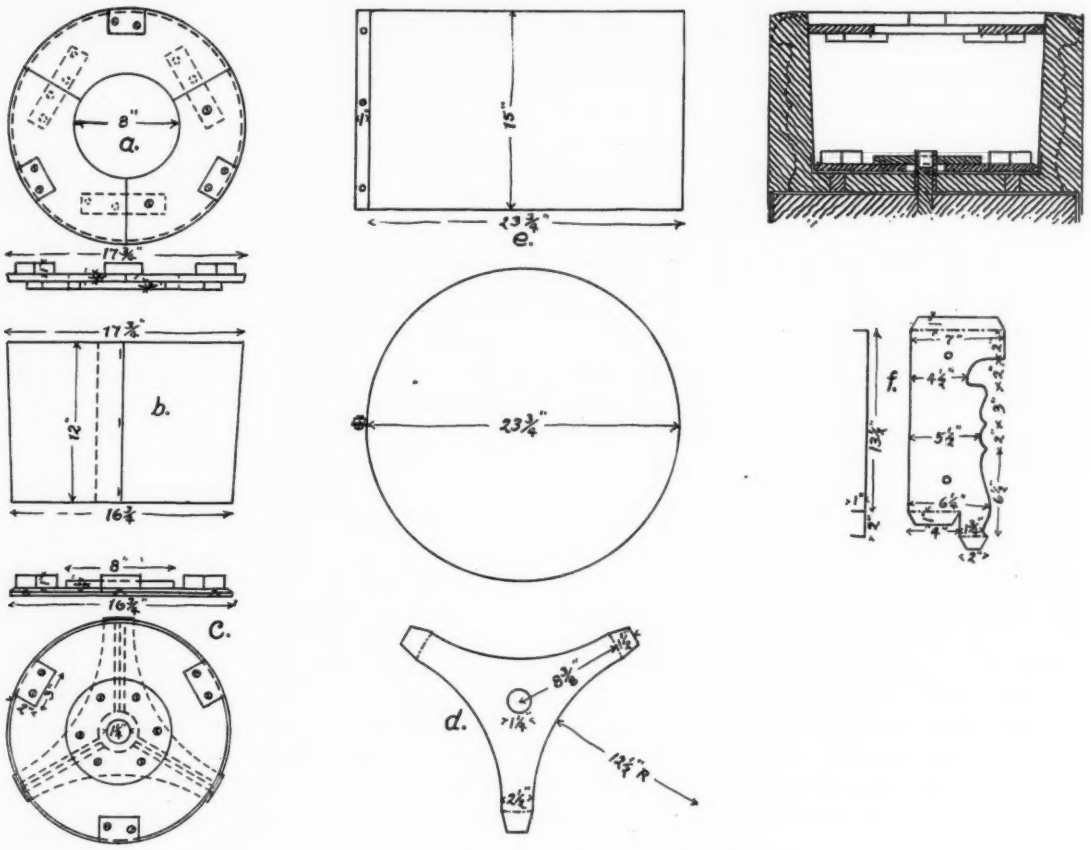


PLATE 11. DETAILS FOR TURNING LARGE POT.

from the core dome, some cement is tamped into the holes in the center, and when this has set the bath is filled with water and allowed to cure.

Plate No. 11 shows the parts necessary for turning a pot of quite large proportion. Due to the fact that the sides of the pot were nearly perpendicular as designed, it could be turned with the pot right side up. The bottom disc was cut into thirds and the adjoining surfaces beveled from the bottom side. About 1½" was cut from the apex of each of the thirds of the disc, and then with the beveled surfaces down, they were assembled, retaining the clearance caused by the saw cut, and fastened together by an eight-inch disc of ½" wood, fastened securely in place with screws from the upper side. A hole was drilled in the center of the disc which received the sleeve that engaged the projecting part of the driving spindle of the turning mill. Three blocks 3" x 2" x 1" were fastened at the center of the outside edge of each third of the bottom disc, being placed upon the top side to receive the tacks which held the core wall in place (see Drawing "c"). The core wall is constructed as shown by Drawing "b" of a piece of No. 22 gauge galvanized iron. The top of the core was retained in shape by a three-segmented ring of wood, as shown by Drawing "a," Plate No. 11. A retaining wall and templet completed the equipment.

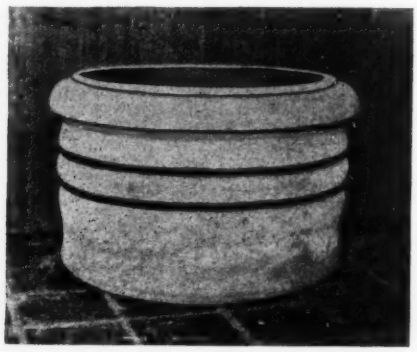


PLATE 11A. LARGE CEMENT POT.

In making a pot of this type the bottom was tamped upon the table of the mill first; the centering sleeve and three 1½" pieces of inch dowel were put in place; the dowel to form the drainage holes, and then the core with its protecting plate in place, were set upon the prepared cement bottom, being centered by the centering sleeve. The retaining wall was then put in place and the rest of the cement tamped in and allowed to set five hours and then turned. When the turning was complete the core was removed from the pot.

(To be continued.)

The Correlation of the Academic Subjects with the Practical Work in Printing

Ralph W. O'Rourke, Springfield, Mass.

THE aims of this plan of organization are: To more closely correlate the academic subjects with the shopwork, to give the classroom teacher suggestions as to which lessons are needed, and to relieve the shop teacher of the responsibility of giving academic work in the shop.

Under this organization each teacher will receive for reference the following sheets: The chart, the vocational guidance sheet, the trade terms sheet, and the sheet pertaining to the particular subject taught by the teacher.

The actual functioning of the system should follow this order of procedure. Assume that room number 12 is going on activity number 15, on the first of June. Notice is sent to all teachers having this particular class about three days previous, notifying them that room number 12 is going on a new activity. Using the correlation chart the teacher can immediately receive the following information: the approximate time spent on this occupation, the new trade terms to be mastered, the opportunities for guidance, and the reference to the academic sheet giving some teaching material with text references.

The comment and method column was instituted to give aid to the shop teacher and the substitute shop teacher.

Correlation sheets similar to these can easily be prepared for woodwork, metal work, electrical work, and cement work, and will be useful not only in junior high schools but in continuation and vocational schools.

MATHEMATICS.

No. 4-M-1.

Study of Fractions

1. What fractional part of an inch is one pica?
2. What fractional part of an inch is one point?

Reference—"Hague", page 9.

CORRELATION CHART.

No.		Approx. Lessons	Mathematics	Trade Science	English	Free Hand Drawing	Mechanical Drawing	Hygiene	Social Science	Trade Terms	Vocational Guidance	Comments and Methods
1	Study of shop	1			E.- 1					T.- 1		Shop rules
2	Lay of case	3				F. D.- 1	M. D.- 1			T.- 2		California job case
3	How type is set	3				F. D.- 2		H.- 1	S. S.- 1			
4	Spaces and quads	3	M.- 1	S.- 1			M. D.- 2		S. S.- 2			
5	Study of b, d, p, q, u, n.	2					M. D.- 3			T.- 3		Use board with sliding lobe
6	Leads and slugs	1				F. D.- 3						
7	Parts of type	2	M.- 2				M. D.- 4			T.- 4		
8	Tools—galley, stick, etc.	4		S.- 2	E.- 2	F. D.- 4						
9	Application of em	2	M.- 3				M. D.- 5					
10	Point system	3	M.- 4						S. S.- 3	T.- 5		
11	Handling type	2				F. D.- 5		H.- 2				
12	Justification	3										
13	Fonts of type	3	M.- 5									
14	Type faces	4				F. D.- 6	M. D.- 6		S. S.- 4	T.- 6		
15	Type metal	2	M.- 6	S.- 3	E.- 3	F. D.- 7				T.- 7		
16	Brass rule	2	M.- 7									
17	Simple setting	8				F. D.- 8					V. G.- 1	
18	Tying-up jobs	1				F. D.- 9						
19	Grammar rules	6			E.- 4							
20	Taking proof	4				F. D.-10	M. D.- 7					Planer and press proofs
21	Proofreading	4									V. G.- 2	Marginal marking
22	Imposition	5		S.- 4			M. D.- 8				V. G.- 2	Chaser method
23	Make-ready	3	M.- 8				M. D.- 9				V. G.- 3	Quads as guides
24	Press feeding	6		S.- 5	E.- 5			H.- 3	S. S.- 5		V. G.- 4	
25	Care of press	3		S.- 6				H.- 4				
26	Parts of press	2			E.- 6		M. D.-10		S. S.- 6	T.- 8		
27	Printing rollers	2		S.- 7	E.- 7							
28	Type distribution	4				F. D.-11						
29	Pi distribution	2										
30	Care of shop	2	M.- 9					H.- 5	S. S.- 7		V. G.- 5	
31	Activities of clerk	3	M.-10		E.- 8				S. S.- 8			Change clerk weekly
32	Elementary display	4	M.-11									
33	Estimating stock	3	M.-12				M. D.-11					
34	Stock cutting	2						H.- 6				
35	Simple two imp. work	8								T.- 9		
36	Borders and initials	6			E.- 9							
37	Job layout	6	M.-13			F. D.-12				T.-10	V. G.- 6	
38	Use of dummy	3										
39	Paper making	10	M.-14	S.- 8	E.-10				S. S.- 9	T.-11	V. G.- 7	Make sheet of paper
40	Printing ink	3	M.-15	S.- 9	E.-11	F. D.-13		H.- 7		T.-12	V. G.- 8	
41	Zinc etching	6		S.-10		F. D.-14		H.- 8				Group work
42	Linoleum block cutting	6	M.-16			F. D.-15				T.-13		Group work
43	Bookbinding	2									V. G.- 9	No practical work
44	Padding	2										Pad cutter waste
45	Linotype	1								T.-14	V. G.-10	Limit to one lesson
46	History of printing	4			E.-12				S. S.-10		V. G.-11	Use Hoe's chart
47												
48												
49												
50												

Activities not necessarily in sequence.

No. 7-M-2.

Study of Decimals

1. What decimal part of an inch is one pica?
2. Type high is what decimal part of an inch?

Reference—"Hague", pages 9 and 11.

No. 9-M-3.

Area Using the Em as a Unit

1. How many 12 point ems in a line 6 inches long?
2. The Industrial Arts Magazine has two columns to a page and each column measures 3 and ⅜ inches by 9 and ¾ inches. Find the length and width in 12 point ems.

Reference—"Printer's Arithmetic", page 35.

No. 10-M-4.

Problems in Space Calculating

1. Figure out in actual thickness in points the following: 3 em space of 12 point, en quad of 8 point, and 4 em space of 24 point.
2. If you needed an en quad of the size type you were setting and there were none available, what combination of spaces would you use?

Reference—"Henry", pages 7, 11 and 12.

No. 13-M-5.

Proportion and Percentage

1. If in an 18A font you receive 20 E's work out a proportion from this data.

Reference—"American Handbook of Printing", pages 24 and 25.

No. 15-M-6.

2. How much tin would you find in 50 pounds of type metal?

Reference—"Hague", page 10.

No. 16-M-7.

Linear and Point Measure

1. A brass rule measures 36 picas. How many inches does it measure?
2. You wish to set your stick for 24 picas and have no pica rule available, would it be possible to set in some other manner?

Reference—"Hague", page 9.

No. 23-M-8.

Use of Rule

1. You have your stock cut 6"x9", the job to go on the press measures 24 picas. How many inches would you set your gauges from the printing on the tympan sheet?

No. 30-M-9

Advanced Proportion—(The Golden Oblong)

1. Make up problems from W. R. Colton's article "Standardizing Proportion."

Reference—"The American Printer", January, 1916.

No. 31-M-10.

Time Card Figuring

1. Time card on job number 354 reads:

Mon. 8:40—10:10	Tues. 8:40—9:30
Wed. 8:55—10:00	Thur. 9:00—9:45

How much time was spent on this job?

Note:—Get time cards from shop teacher.

No. 32-M-11.

Esimating Jobs

1. Consult teacher for practical jobs to figure.

No. 33-M-12

Estimating Stock

1. Show how many sheets can be obtained in cutting 5¾"x8¾" sheets from 19x24 inch stock.
2. What will the wastage amount to?

Reference—"Printer's Arithmetic", page 24.

No. 37-M-13.

Figuring Paper Weights

1. If a ream of paper weighs 20 pounds and is 17"x22" find the weight of a ream of paper (same stock) measuring 17"x28".

Reference—"Printer's Arithmetic", page 24.

No. 39-M-14.

Continue on M-13

No. 40-M-15.

Estimating

1. Estimate the cost of ink for one year for the Buckingham Print Shop.

NOTE:—Get data from the instructor.

No. 42-M-16

Figuring Area

1. The linoleum needed to make a cut to print the cover of the school magazine is a piece 7"x10". How much is needed to make cuts for the entire year?

NOTE:—There are six issues and the Christmas number requires three pieces.

TRADE SCIENCE.

No. 4-S-1

Oils

1. Gasoline, Kerosene, and lubricating oils are used daily in the print shop. Study process of refining and properties of each.

No. 8-S-2.

Copper, Brass, and Nickel

1. Study of elements and alloys. Advantages of these metals over others in equipping a print shop.
2. Discuss erosion.

No. 15-S-3.

Lead, Tin, and Antimony

1. Study of properties of each.

Reference—"Hague", page 10.

No. 22-S-4.

Study of Inclined Plane and Wedge

1. Work out some practical problem to demonstrate.
2. Teach some practical problem using the Hemple Quoin.

Reference—"Henry", page 164.

No. 24-S-5.

Static Electricity

1. Discuss static electricity.
2. Conduct practical experiments to show how it is produced.
3. How do we get static electricity while feeding the press?

No. 25-S-6.

Spontaneous Combustion

1. Danger in the oily rags left out of can.
2. Practical demonstration of spontaneous combustion.

No. 27-S-7.

Composition of Printing Rollers

1. Glycerine, glue and molasses.
2. What is the function of each ingredient?

No. 39-S-8.

Rag and Wood Pulp

1. Chemistry of paper making.
2. Study of colors.

Reference—"American Handbook of Printing", page 131.

No. 40-S-9.

Ingredients of Printing Ink

1. Study of pigments. Carbon, lampblack, and ivory black.
2. Study of ingredients used as vehicles.

Reference—"American Handbook of Printing", page 153.

Uo. 41-S-10.

Acids and Bases

1. Action of nitric acid on zinc.
2. Dangers from fumes.
3. Action of bases on acids.

ENGLISH.

No. 1-E1.

1. Spelling words—

Pica	Matrix	Punctuation
Galley	Fonts	Quads
Chase	Exclamation	Reglets
Quoin	Interrogation	Justify

2. Look up meanings of these words and use in sentences.

Reference—"Henry", chap. 1.

No. 8-E-2.

1. Write a composition explaining the way the stick is held and how type is set.
2. Spelling words—

Type-high	Copperplate	Slug
Hair line	Typography	Legibility
Mitered	Lithography	Kerned

Reference—"American Handbook of Printing", page 9.

No. 15-E-3.

1. Write a few words on typemaking.
2. Spelling words—

Gutenberg	Typefounder	Cylinder
Linotype	Hyphen	Platen
Monotype	Steel die	Cambridge

Reference—"American Handbook of Printing", page 13.

No. 19-E-4.

1. Review of grammar rules.
2. Punctuation marks—(Stress the hyphen, colon and semi-colon).

No. 24-E-5.

1. Write a composition on, "How to run a platen press and the precautions to take while running the press."
2. Spelling words—

Platen	Grippers	Tympan
Ink disk	Throw-off	Padding
Chase bed	Treadle	Overlay

Reference—"Hague", page 167.

No. 26-E-6.

1. Give a three minute talk on, "The parts of the press and their functions."
2. Spelling words—

Functions	Lugs	Reflexive
Shaft	Gudgeons	Accessories
Gears	Glycerine	Precautions.

Reference—"Hague", page 168.

No. 31-E-8.

1. Write a letter to your home room teacher that the printed charts are ready for distribution.

No. 36-E-9.

1. Make out an order for two fonts of No. 678 12 point border

AMERICAN TYPE FOUNDERS,
JERSEY CITY, N. J.

No. 39-E-10.

1. Give an oral talk on, "The manufacturing of paper."

Note:—Use the AMERICAN WRITING PAPER COMPANY chart.

2. Give an oral talk on, "The manufacturing of paper as it was accomplished in the school print shop."

References—"Henry", page 263; "Hague", page 203.

No. 40-E-11.

1. Write a paper on "Ink Manufacturing."
2. Spelling words—

Spatula	Sepia	Pigments
Constituents	Palette	Artificial
Cochineal	Mottled	Sensitive

Reference—"Hague", page 191.

No. 45-E-12.

1. Give an oral talk on, "How a newspaper is published".

Reference—"American Handbook of Printing", page 165.

FREE HAND DRAWING.

No. 2-F. D.-1.

1. Letter in case chart supplied by the printing instructor.

No. 3-F. D.-2.

1. Make a drawing of: "Proper Method of making up a nongraduated composing stick."
2. Make a drawing of: "The correct way of holding a composing stick."

Reference—"Henry", Figures 9 and 12.

No. 6-F. D.-3.

1. Make a drawing showing: "How to sort leads and slugs."

Reference—"Henry", Figure 28.

No. 8-F. D.-4.

1. Make a free hand drawing of a "Star" stick.

Reference—"Henry", Figure 8.

No. 11-F. D.-5.

1. Make a drawing of: "How to empty a stick full of type."

Reference—"Henry", Figure 13.

No. 14-F. D.-6.

1. Make a lettering chart showing the different styles of letters grouped under these headings: Text, Gothic, Roman, Italic, and Script.

Reference—"Henry", page 73.

No. 15-F. D.-7.

1. Make a drawing showing the various parts of a piece of type.

Reference—"Henry", Figure 26.

No. 17-F. D.-8.

1. Make a drawing illustrating: "How type should be held for distribution."

Reference—"Henry", Figure 29.

No. 18-F. D. 9.

1. Make a drawing of: "Method of tying cord for future use."

Reference—"Henry", Figure 25.

No. 20-F. D.-10.

1. Make a free hand drawing of: "Method of holding and tapping the proof planer."

Reference—"Henry", Figure 18.

No. 28-F. D.-11.

1. Make a drawing of: "Separating individual letters while distributing."

Reference—"Henry", Figure 27.

No. 37-F. D.-12.

1. Make sketches for layout of letterheads.

Reference—"Henry", Figures 55 and 56.

No. 40-F. D.-13.

1. Make a chart showing how to mix and harmonize colors.

Reference—"American Handbook of Printing", page 160.

No. 41-F. D.-14.

1. Make a seasonal design for linoleum block.

No. 42- F. D.-15.

1. Make a design for a zinc etching.

MECHANICAL DRAWING.

No. 2-M. D.-1.

1. Make a drawing (top view) of the California job case.

NOTE:—Lay out in squares first.

Reference—"Hague", Figure 10.

No. 4-M. D.-2.

1. Make to scale a drawing of: "The relative sizes of spaces and quads." (top view).

Reference—"Hague", Figure 4.

No. 5-M. D.-3.

1. Make a drawing of the letters p, b, q, d, u, n, l, I. Show the letters as they appear when printed and as they look when cast.

NOTE:—Get letters from the print shop.

No. 7-M. D.-4.

1. Make an isometric drawing of the parts of the letter H.
2. Letter the name of each part.

Reference—"Hague", Figure 2.

No. 9-M. D.-5.

1. Make a full sized drawing of the ems from 6 point to 72 point. (Top view).

Reference—"Henry", Figure 4.

No. 14-M. D.-6.

1. Make a full sized drawing of the quads and spaces of 72 point type from the 5 em space to the 3 em quad. (top view).

Reference—"Henry", Figure 5.

No. 20-M. D.-7.

1. Make a drawing of the proof planer. (three views).

NOTE:—Get the planer from the print shop.

No. 22-M. D.-8.

1. Make an isometric drawing of a piece of printer's furniture 10x60 picas.

NOTE:—Get the furniture from the print shop.

2. Make a drawing of: "How to lock a form."

Reference—"Hague", Figure 60.

NOTE:—Teach Chaser method of lock-up.

No. 23-M. D.-9.

1. Make a drawing of: "How to set guides and fenders."

Reference—"Henry", Figure 139.

No. 26-M. D.-10.

1. Make a drawing of the press. (similar to drawing in reference).
2. Letter in the name of each part.

Reference—"Hague", Figure 68.

No. 33-M. D.-11.

1. Make a drawing of a sheet of paper showing how it is possible to get more pieces out of a sheet one way than it is another.

TRADE HYGIENE.

No. 3-T. H.-1.

1. Lead poisoning. Dangers, how contracted, how to avoid, symptoms of, and how to prescribe for.

References—"Safety First for Vocational Schools", page 67.

No. 11-T. H.-2.

1. Narcotics. Dangers in use especially to printers.

No. 24-T. H.-3.

1. Precautions to take while running the press.
   a. Avoid loose clothing.
   b. Avoid distraction.
   c. Study the press you are working on.

No. 25-T. H.-4.

1. What to do if caught.
   a. Discuss the treatment of bruises and cuts.

No. 30-T. H.-5.

1. Discuss benzine and lye and their effect on the skin.

No. 34-T. H.-6.

1. Precautions to take on the paper cutter.

No. 40-T. H.-7.

1. Take up the guarding of printing presses.

Reference—"Safety First for Vocational Schools", page 68.

No. 41-T. H.-8.

1. Dangers in using nitric acid.
2. Dangers from fumes of nitric acid.
3. How to treat an acid burn.
4. Discussion of bases.

SOCIAL SCIENCE.

No. 3-S. S.-1.

1. Conduct a study of the: "History of Printing" from the earliest works up through Franklin's time.

Reference—Hoe's History of Printing. Chapter 1.

No. 4-S. S.-2.

1. From what source do we get our lead for type?
2. Locate the lead mines in the United States.
3. Route the lead from the lead mines to the "American Type Founders" in Jersey City, N. J.

No. 10-S. S.-3.

1. History of the point system.
   a. Why was the point system originated?
   b. How did it come into use in this country?
   c. Methods of measuring prior to the adoption.

Reference—"American Handbook of Printing", Chapter on the point system.

No. 14-S. S.-4.

1. Study of type faces.
2. Development since 1431.
3. Study of type faces in connection with their creators.

Reference—"Henry", Chapter 6.

No. 24-S. S.-5.

1. Discuss: "The child labor laws of Massachusetts."

NOTE:—Emphasize the law relative to children under 16 years of age working at hazardous occupations.

Reference—"Child Labor Laws of Massachusetts."

No. 30-S. S.-6.

1. Discuss the State law in regards to safety devices for printing presses.

No. 31-S. S.-7.

1. Study of the development of the printing press.

Reference—"Hoe's History of Printing."

No. 39-S. S.-8.

1. Study of the development of the art of paper-making from the papyrus sheet to the modern sheet of paper.

Reference—Material from the American Writing Paper Co.

No. 31-S. S.-9.

1. Discuss some of the noted men who have been directly connected with the printing industry.

Examples—Gutenburg, Franklin, Harding, Cox, etc.

TRADE TERMS.

References—"Technical Terms and Definitions;" "Hague", pages 236-237.

No. 1-T. T.-1.

Stone	Case	10 Point
Cutter	Body Type	Pi
Press	Cheltenham	Copy

No. 2-T. T.-2.

Lay	Upper Case	Kerned
News	Lower Case	Leaders
Asterisk	Caps.	"Quotes"
California	Ligatures	"Parens"

No. 5-T. T.-3.

Ascending	Stem	Gothic
Descending	Serif	Series
Lobe	Roman	Font

No. 7-T. T.-4.

Heavy Element	Shoulder	Groove
Light Element	Body	Pinmark
Counter	Nick	Script
Neck	Feet	"Point-set"

No. 10-T. T.-5.

Point	Align	3 Em
Pica	Pica Type	4 Em
Nonpareil	Em	2 and 3 Em quads
Line Gauge	En	Thin Spaces

No. 14-T. T.-6.

Text	Black Letter	Modern
Gothic	Cloister	Display
Roman	Goudy	Type Families
Italic	Old-style	Swash

No. 15-T. T-7.

Antimony	Type-high	Founder
Type Metal	Typography	Wrong Font
Type Caster	Typotect	Wood-type

No. 26-T. T.-8.

Platen	Grippers	Fly Wheel
Rollers	Ink Fountain	Gudgeons
Ink Disk	Throw-off	Feed Board
Chase Bed	Foot Treadle	Impression Screws

No. 35-T. T.-9.

Brass Rule	Dummy	Spatula
Ornaments	Mortised-design	Ink Slab
Skeletonize	Metal Furniture	Make-ready

No. 37-T. T.-10.

Layout	Sheetwise	Tabular Composition
Hanging Indention	Slugs	Two-on
Letter-spaced	Leads	Typographic

No. 39-T. T.-11.

Papyrus	Degester	Dandey Roll
Vellum	Jordan	Deckle
Fiber	Beater	"M. F."
"Stuff"	Water-marked	Onion Skin

No. 40-T. T.-12.

Varnish	Pulling-off	Tint
Pigment	"Picking"	Specks
Slab	Palette	Vermillion
Rosin	Tack	Bismark

No. 42-T. T.-13.

Bearers	Drier	"Lift"
Chase	Slip-sheet	"Lock-up"
"Dead"	Gauges	Offset
Drawsheet	Impression	Packing

No. 45-T. T.-14.

Forms	Register	Stock
Linotype	Stereotype	Sorts
Monotype	Vignette	Duotone
Electrotype	Work-and-turn	Embossing

VOCATIONAL GUIDANCE.

On this vocational guidance sheet the printing trade has been split up into the different occupations along with the allied trades. Each occupation should be taken separately and the following questions answered in connection with each activity.

1. What is the function of the occupation?
2. How are positions secured?
3. Of what importance is it?
4. What are the hygienic conditions?
5. What are the wages paid?
6. What are the demands for labor?
7. What are the mental and physical requisites of the trade?
8. What are the opportunities for advancement?
9. Where is the nearest shop where this trade may be learned?

A general printer (small shop).	No. 17-V. G.-1.
Proofreader and copy holder.	No. 21-V. G.-2.
Stoneman.	No. 23-V. G.-3.
Pressman.	No. 24-V. G.-4.
Shop superintendent.	No. 30-V. G.-5.
Layout man.	No. 37-V. G.-6.
Paper trades.	No. 39-V. G.-7.
Ink manufacturing.	No. 40-V. G.-8.
Bookbinding trades.	No. 43-V. G.-9.
Machine compositors.	No. 45-V. G.-10.
Photo engraving.	No. 46-V. G.-11.

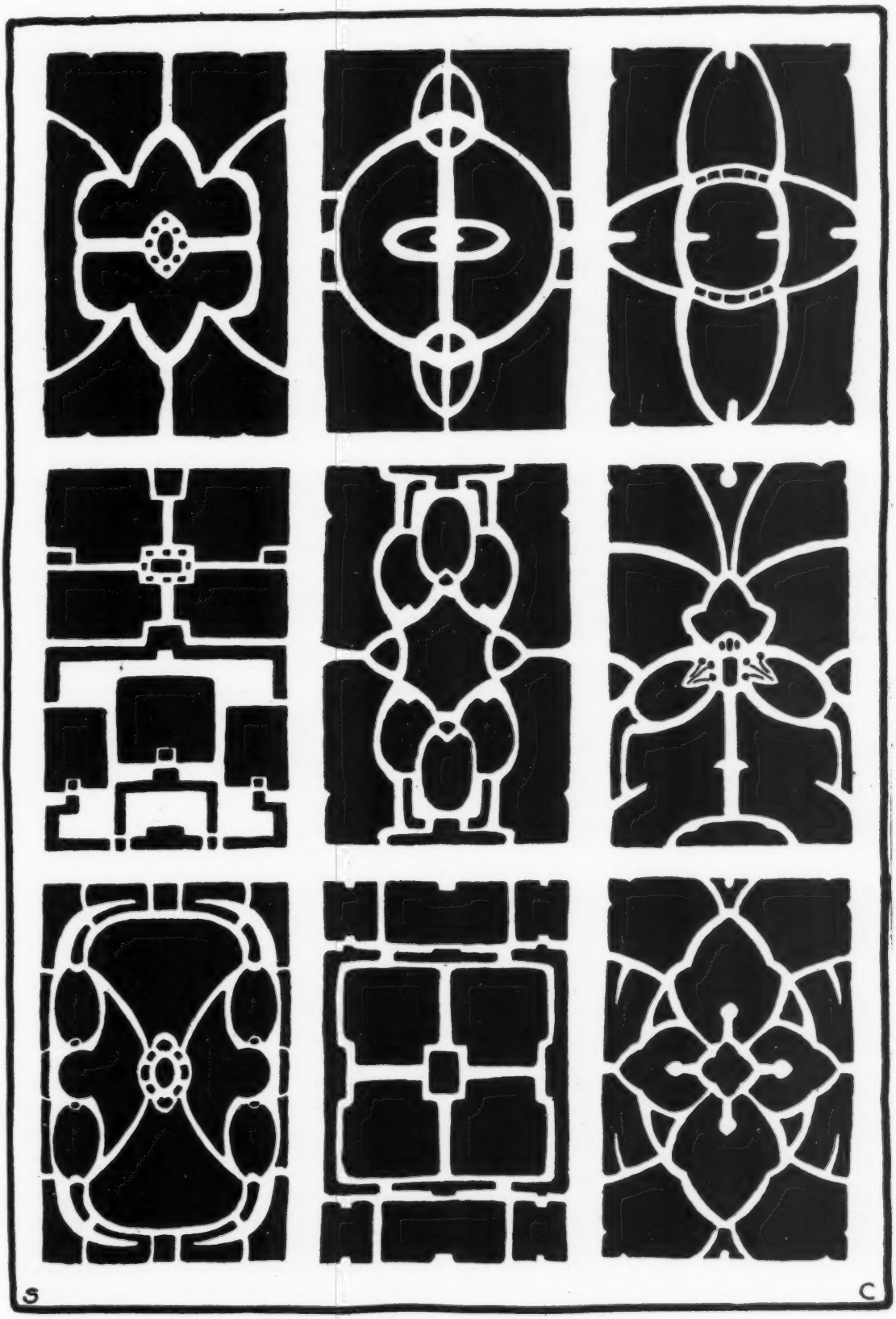


PLATE XII

THIS IS THE TWELFTH OF A SERIES OF PLATES BY MISS SARA COHOON, SPRINGFIELD, MASS.

INDUSTRIAL-ARTS MAGAZINE

E. J. LAKE S. J. VAUGHN
Editors

EDITORIAL

FABLES.

It was a long-tailed, narrow-collared coat of several years' service. The cloth was still good but the design was conspicuously out of style. New coats cost a lot of money these days and a wise little tailor might cut off the tail and use it to advantage on a new and wider collar, thus making both ends come nearer meeting for the owner, the coat and the tailor. But the wise little tailor said No! It can't be done. The tail can be cut off; the collar can be widened, but the lapels cannot be made in proportion to the collar and the garment will be worse in design than it is now.

It was a manual training work-shop with equipment that allowed the boys to turn out a set of wooden models made and finished exactly according to a set of blueprints that had been collected and prepared by the ex-carpenter, manual training teacher, who was given the job because he was a fair mechanic and could get along with the boys. Then came the need of some furniture for the principal's office and some sidewalks and some playground equipment and the manual training teacher rose to the occasion and the school shop became, with the help of some of the boys, the most useful and versatile part of the school disorganization.

Some of the boys got the idea of following a trade and some got the idea of following several trades, and some got tired of doing the chores about the school and decided to change their course.

The manual training teacher died of industrial and vocational indigestion. The new manual training teacher was a rather indifferent mechanic but not too old to learn. He realized that the best way to learn most things was by intelligent experience. He realized that a right minded and well directed pupil might accomplish some things that even the teacher had not told him about. He set about to remodel the old shop into a sort of laboratory where the boys carried on a series of experiments in the way of design and construction under his direction but not under his rigid and complete dictation.

Of course, these designs and experiments were directed to give the pupils interest and understanding related to very few kinds of industry. They all lived in houses and they all used the utensils of play and work common to the community. They all wore clothes and used machinery of simple sort. There was not an opportunity to teach a particular trade to each and all of the boys and girls of the school and the teacher was not a skilled mechanic, or carpenter, or electrician, or shoemaker, or tailor. He was a skilled teacher of boys and girls and he had a fair knowledge of industrial design and device and he had a way of getting technical advice from the local industrial workers who were engaged in a variety of trades and professions. So he made over the old manual training shop and course into a real industrial art laboratory, not by cutting off its industrial tail to make a vocational collar, but by a careful review of the whole garment and adjustment of it to the purpose for which it was created. Style and custom be hanged!

TEACHING COLOR.

With the idea that our art instruction should be directed so that the pupil is led to discriminate and judge rather than to create a new order of things, we cannot avoid the necessity of giving our pupils in the Industrial Arts a considerable experience in identifying and relating colors. They should at least learn to match colors intelligently and mix colors in pigments with some degree of assurance. Mixing pigments to secure a desired color depends on the way in which one pigment reacts on another by mixture. The commercial pigments have not only different hues, values and intensities, but they have also different reactions when mixed.

Even the name of a color is of less importance than some understanding of its properties and its possible uses. The common names of primary and secondary colors should be learned, of course, as a means of discourse but names of colors are subject to change. Names without description are poor means of identification. Samples are the only safe identity of standards and every school shop, classroom and studio which has to deal with colors should have standard samples before the pupils as a basis for comparison. It would be a sorry outfit for instruction in form and proportion that had no standards of measurement, yet many art teachers attempt to teach the representation of things in colors with no standard colors at hand for comparison. The result is that children grow up and finish their school experience with only a vague conception of red, yellow, blue, green, orange, and violet as of no particular value or intensity.

The results of examination for college entrance show clearly that but a small per cent of many hundreds of high school graduates are able to name the primary and secondary colors in their chromatic order. The industrial art teacher must take up the burden of this instruction because it is fundamental in the judgment and use of the commodities of living. As to harmonies, it is well to realize that there are no definite combinations of colors that go together well under all circumstances and no colors that are inharmonious under all circumstances. Perhaps the best way to lead a class to discriminate between colors in relation is to have them fill in a variety of designs in a variety of ways and select the most effective as good and the least effective as bad. Then develop precepts of good and bad from their own experience rather than to insist that

a given combination is good on authority. All harmony is conditional.

Reference to nature will establish some conviction but even this must be considered in the light of conditions and purpose. The harmonies of nature are not harmonious under unnatural conditions.

Harmonies secured by a very great reduction of intensity are apt to result in the avoidance of color rather than the intelligent and appreciative use of it. As a people we have flattered ourselves on the use of little color. We are drab in our use of color in costume and architecture. Through the example of our painters we may well use color more freely and fearlessly. Our industrial design is even more deficient in color than in other qualities and the obligation of development in this direction lies with the teacher.

VOCATIONAL PROSPECT.

The annual report of the committee on appointments from one large state institution shows twenty-seven per cent decrease over last year in the appointment of graduates to positions but according to the report this decrease is due to the increased number of students and to economic conditions over which the committee had no control.

In spite of this decrease this committee put students into positions allowing them to earn during the first year of service $848,772.00.

This was done at a total cost to the institution of $3,500.00.

The commission of five per cent of the first year's earnings usually paid to teachers' agencies for such service would have cost the candidates a total of $42,438.60.

The returns on such an investment cannot be measured in dollars. The school that helps students to their first service and follows them up to successful accomplishment, not only helps the students but helps itself to an established position as a successful institution.

The majority of boys and girls leave the common schools in their approach to legal mature age and with the necessity of making a living. These common schools can not afford to neglect the opportunity to prepare them for this obligation and to make every effort to place them in the work for which they are best prepared. The public schools should be no more in the business of preparing teachers than in preparing for other occupations. The common schools can not prepare expert workers in a variety of technical work but if counsel is held with each pupil of a school during the school attendance and if advisors are informed of available opportunities for employment, much can be done in the way of bringing the right boy and girl to the right opportunity. The first task of the school committee on vocational advisement may well be to classify the students according to their abilities and interests. The second task is to develop those abilities and interests. The third task is to classify the available occupations according to the abilites and interests of the students. The fourth task is to bring the student who needs occupation for a livelihood into a position of service. The fifth task is to follow up the boy and girl who leave school and lend such aid as may be necessary in the way of adjustment.

In the statement of one who has had some years of experience in this important work; "I do not think placement is important simply so that we can get jobs for Johnny, or that we can get boys for a certain employer." "Public school employment service that classifies, that certifies, that places, that follows up, that keeps in contact with the employer and with the employee, and that gets all of this information back into the school system is going to put us into possession for the first time of adequate information as to what becomes of the young people we are training in our schools."

THE FEDERAL BOARD REPORT.

The Federal Board of Vocational Education has just issued its report for the year ending July 1, 1922. The report shows that the total enrollment in vocational schools receiving federal aid was 475,828. Of this number, 259,287 students were males and 216,541 were females. The instruction in agricultural vocational subjects was given to 60,236 students, trade and industrial instruction was given to 296,884, and home economics was given to 118,708 students. The largest number of students—228,655—were enrolled in part-time continuation schools. The enrollment in evening schools was 133,835 and the enrollment in all-day vocational schools was 113,338. The number of teachers, as well as of students, is increasing rapidly. The federal money went to a total of 12,280 teachers in 1922. Federal grants were distributed to 171 teacher-training institutions. As reported for 1922, the total expenditure of federal, state and local money under the vocational education act, amounted to $4,020,306 for vocational agriculture education, of which sum, the federal board contributed $1,435,397. For vocational, trade and industrial education, exclusive of part-time continuation school work, the total expenditure was $3,846,-799, of which the federal reimbursement was $785,270.

Home economics education cost a total of $2,116,-306 for which federal funds were contributed to a total of $246,628. For part-time continuation schools, the total amount spent was $2,570,902. Of this sum, the federal government contributed $386,749. The state and local school taxing authorities contributed nearly $6 for every $1 of federal funds.

For vocational teacher-training the total expenditure was $2,215,148, of which $1,000,523 was federal money. The total expenditures in the states were $14,-770,142. Of this great total the federal grants amounted to $3,854,570. In other words, the states contributed $3 for every $1 of federal moneys.

The Development and Modifications of the Kimono Type of Garment

Alice M. Lindsley, Plainfield, N. J.

THE kimono type of garment always proves satisfactory for the first problem in seventh, eighth or ninth year sewing. For the experienced sewer it is easily made without a pattern, but for the inexperienced school girl it is best to have some definite rules to follow. In this way the pupil gains some knowledge of simple garment drafting and designing. It also tends to create interest, originality and independence in workmanship.

There are two types of garments:

(A) Bias underarm seam, back and front on fold.

(B) Straight underarm seam, back and front on fold.

Type A is in use for

1. Infants' clothes.

2. Children's clothes, dresses, aprons, rompers, nightgowns, kimonos, and coats.

3. Girls' and women's aprons, home dresses, dresses, blouses, nightgowns and negligees.

Type B is used for all the above garments.

To determine the amount of material desired, measure from the highest point on shoulder, twice the length of the garment desired, plus twice the hem. If material is narrow, allow for extra width and also for long sleeves if they are desired. For an adult's garment from sixty inches to two yards is a good average width for the bottom.

For a child's dress a good average width is one and one-half yards.

To Cut: Straighten the material by pulling, then fold material lengthwise, the selvages together, then from cut end to cut end.

The lengthwise folds will be the center front and back of the garment. Crosswise folds will be shoulder and sleeve.

Sleeves: For an adult garment.

Measure down on the selvage from the crosswise fold, not less than 8" for 36" bust. Add 1" for each additional 2" bust measure; example, measure down 9" for 38" bust, 10" for 40" bust, etc. With scissors draw a line from this point to the lengthwise fold, parallel to the crosswise fold. (Figure 1, line a-b).

Sleeves: For child's garment.

Measure one-half the armseye of a well fitting garment. Measure down on selvage for point A (or depth of sleeve).

Fullness through bust. Take bust measure of garment if for adult. If for child take chest measure. Add one-fourth of the bust or chest measure to this measurement. Since the material is folded into quarters, divide the above measurement (one fourth of the bust or chest measurement plus bust or chest measurement) by four, allow one-half to three-fourths inch for seam and measure out this distance from the lengthwise fold on line a-b.

Example: For 36" bust: 36 plus 9 is 45. 45 divided by 4 is 11¼ plus ¾" seam allowance is 12". Measure out twelve inches from center front on line a-b (see diagram, point C.)

Determine the width desired for garment at bottom, measure out one-fourth this distance from the lengthwise fold (see figure point D), draw line connecting C and D. If the material is not wide enough to make garment the desired width, point D will be off the material (see dotted line m-n). Use strips which came from under the arm to piece out the sides at the bottom.

Measure up one inch on line c-d (point E) and connect with bottom end of lengthwise fold with curved line.

Fill in angle under the arm with curved line (see figure A to E). This forms the under arm seam.

Neck opening: For low neck.

This is the smallest measurement which will allow the garment to slip on over the head. Measure around the largest part of the head, and divide this measurement by six and one-half. If the garment is to fit close up around the neck, divide the neck measure by six and one-half. This gives the radius of the circle which when cut forms the neck opening. Cut front of neck on top fold at least one inch lower than the back and slant to nothing on the shoulder. This makes a better shaped neck line.

Using this principle for a foundation, all sorts and shapes of neck lines may be cut. It is a good plan to practice cutting different designs from some inexpensive material. In this way a lesson on simple designing may be given.

Type B (straight under arm seam, front and back on fold) is very good for dresses and rompers.

A straight cut in from the selvage edge is made at any desired point, about 17" to 19" down from the shoulder for a long waisted effect, at the waist line for rompers, or higher up under the arm for a child's dress. After marking line, with point of scissors, (d-e) measure up from D, 1", and mark F. Draw a line from F to E, and cut on

CHILDREN'S DRESSES BASED ON THE LESSONS OUTLINED BY THE AUTHOR.

ROMPERS MADE BY EIGHTH GRADE GIRLS.

both these lines. This is done to draw the fullness away from the front, and also leaves the garment straight around the bottom. It is especially good for checks on which cross-stitching may be done, or in voiles, on which drawn work or hemstitching may be used for decorations.

Under the writer's supervision this problem was tried out in eighth grade classes. Children's rompers and dresses in ages ranging from two to eight years were made.

Two girls worked together, chose their own materials, and decided on the mode of decoration. The department furnished the materials used.

They were sold at parent-teachers' meetings at a price covering the actual cost of the material plus a few cents profit. It was not our aim to make a large profit, but to serve as a lesson in service.

It is our intention now to use the money derived from the sale to buy materials for a layette problem. This will give the girls another valuable lesson in judgment, shopping, planning and constructing "baby's first clothes."

A number of high school girls made wool jersey dresses, using Type B directions. This made a very inexpensive school dress, as only the length of the dress plus the hem was needed. They were cut in just below the waistline and gathered. As the jersey were tubular there was no side seams in the skirt, but one on the shoulder. This was an attractive, as well as very satisfactory problem.

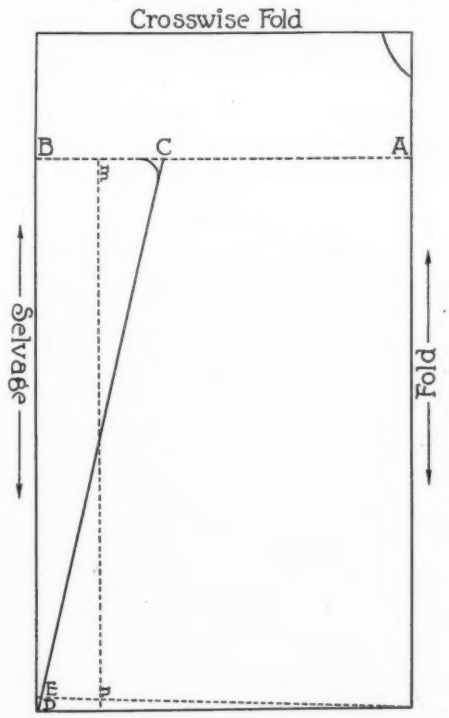


FIG. 1. TYPE A GARMENT.

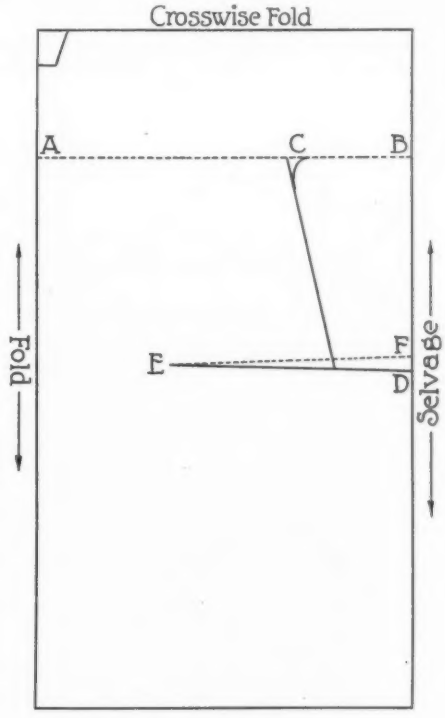


FIG. 2. TYPE B GARMENT.

Knots and Rope Work

Leon H. Baxter, St. Johnsbury, Vt.

FROM the earliest time, rope has played an important part in the world's history.

Primitive man used vines and grasses to snare his game, and in medieval times knots had a prominent place in heraldry.

Many a time the loss of property, and even life, may be traced to the insecure tying of a knot.

In the city, or on the farm, in the earth's depths or in the wilderness, on land or sea, a knowledge of how to tie a secure knot is invaluable.

Two or more yarns twisted together form a strand; three or more strands form a rope and three ropes twisted together form a cable.

It is sometimes important to know how much a rope will sustain. Approximate results may be obtained by multiplying the circumference of the rope by itself and the result by the rope's length in fathoms; then divide this result by 3.75. A fathom is six feet in length.

There are three main parts to a rope, which will be taken in order. The main portion of the rope or the longest part, is called the standing part. The part that is curved while being used is called the bight. The end is the part used in forming the knot, or hitch. These are shown in Fig. 1, Plate 1.

Rope ends have a tendency to fray, or unravel, and to prevent this the ends of the rope are whipped. A good method of whipping is shown in Fig. 2. One strand is unwound a couple of turns and a piece of twine inserted and pulled through and laid over itself on the rope as in A.

Replace the strand of rope. End B is now carefully wound around the rope working toward its end and over loop A, for eight or ten turns. Make a large loop with end B and lay end B flat on the previous windings, and continue the turns for eight or ten more windings. Now pull on end B and the whipping is complete after cutting off the ends even with the whip. The drawing is self-explanatory.

The "Overhand Knot," shown in Fig. 3, is a very simple yet quite important knot, as it is used in fastening the ends of strands and in splicing, whipping and sizing.

The "Figure 8" knot is shown in Fig. 4, and is nearly as easily tied as the drawing shows.

It will be noticed in the drawings that the knot is sketched loose and does not appear as it will when pulled up close.

This is done so that each step in the process of forming the knot can be plainly seen by the beginner.

One of the most useful of knots is the "Square Knot," shown in Fig. 5, Plate 2. It is strong and yet easily untied and is formed by passing the left end over, then under the right end, and then the right over and under the left.

After once having this method firmly impressed in your mind you will never have your knot turn out to be that most worthless of all knots, the "Granny," Fig. 6.

Under severe strain the square knot will slip when two ropes of unequal size are tied together. To overcome this the two double ends are sized as shown in Fig. 7. This is merely whipping the two ropes to hold them taut.

The "Ordinary Knot," shown in Fig. 8, is formed by making a simple knot with one rope and then with the rope to be joined follow around the first knot. This is a reliable knot which allows the rope to hang in a straight line.

For joining small lines one of the best knots is the "Fisherman's Knot," Fig. 9, Plate 3.

An overhand knot is made in one line and the second line slipped through the knot, and its own end in turn tied about the first line with another overhand knot. These lines may be instantly untied by pulling on the loose ends, A and B.

The "Weaver's Knot," Fig. 10, is another useful knot for joining small lines, especially thread. It is quickly tied by crossing an end across the standing part and then making a loop in the second line and slipping this through the loop formed by the first line, and then slipping end C through the second loop.

For joining heavy ropes the "Carrick Bend," shown in Fig. 11, is without a peer. This handsome knot is tied by first forming a bight by laying the end across the standing

PLATE I.

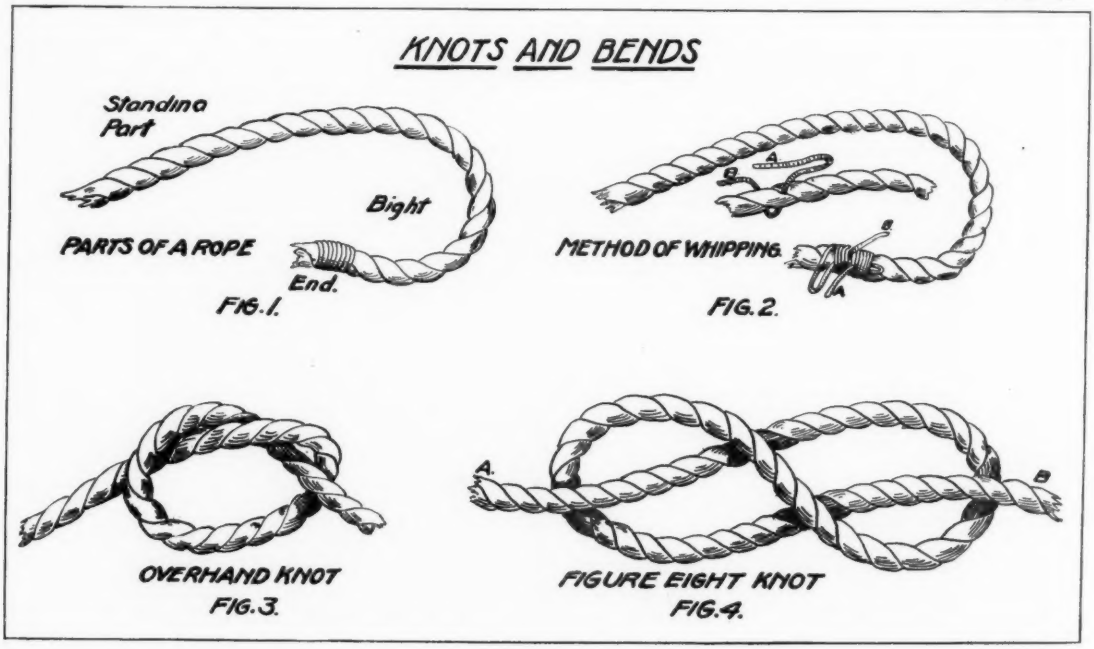


PLATE 2.

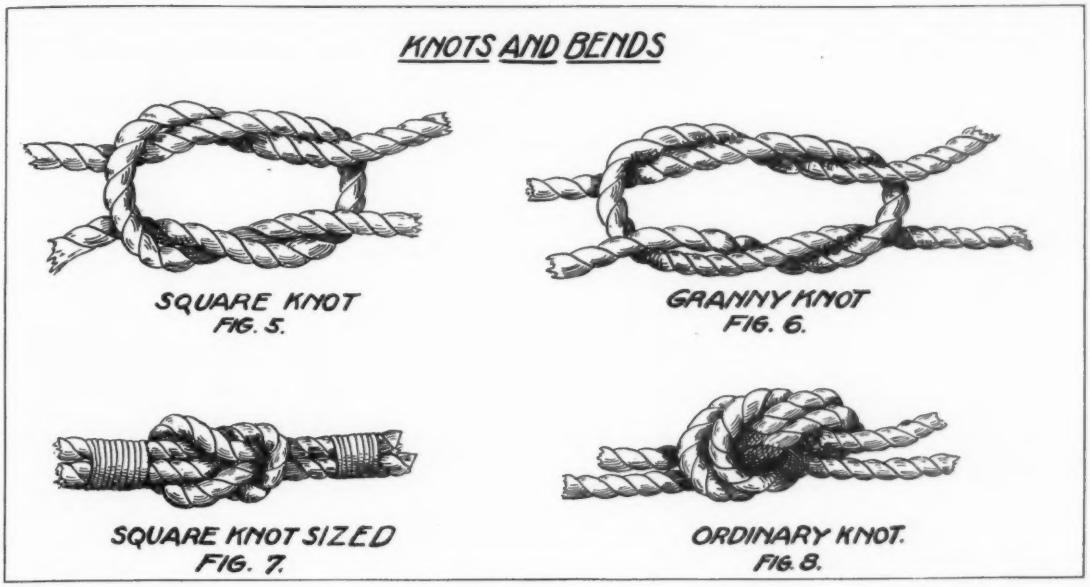
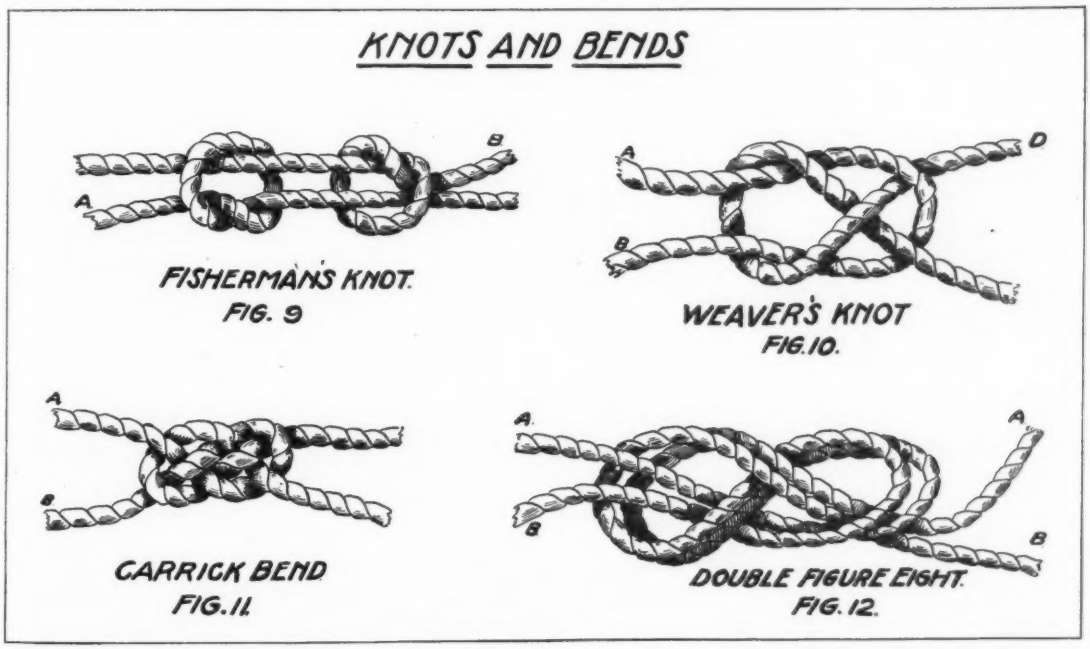


PLATE 3.



part. Next with the end of the second rope, run across the bight and under part A, thence over B and under the bight, up and through and over its own standing part.

The "Double Figure 8", shown in Fig 12, is a very fine knot for preventing a rope running through a ring or a block.

It is easily made by forming a single figure 8 and then following around with the second rope.

The real, "Sailor's Knot," and a knot of great importance, is the bowline shown in Fig. 13, Plate 4. This is tied by first forming a "Cuckold's Neck," as it is termed, shown at A, Fig. 13, step 1.

The rope's end B is run through this, under and over the standing part and down through the neck A again (Step 2) and out into the bight, Step 3.

To form a running bowline simply run the rope through the bight of the bowline.

Fig. 14 shows two types of "Half Hitches" and the drawings are self-explanatory.

The "Timber Hitch," Fig. 15, is very useful in holding fast on smooth timber and is used by contractors in holding staging to uprights. It is also useful on wet spars. Simply pass the rope around the timber and then twist it several times around, under and over itself.

Fig. 16 shows the "Timber Hitch" with a half hitch added for extra strength and security.

Fig. 17, Plate 5, gives the method of tying the "Clove" or "Builder's Hitch." This is used in securing pieces of scaffolding together. This knot holds laterally very firmly. It is an excellent knot for securing tent rope to pegs.

PLATE 4

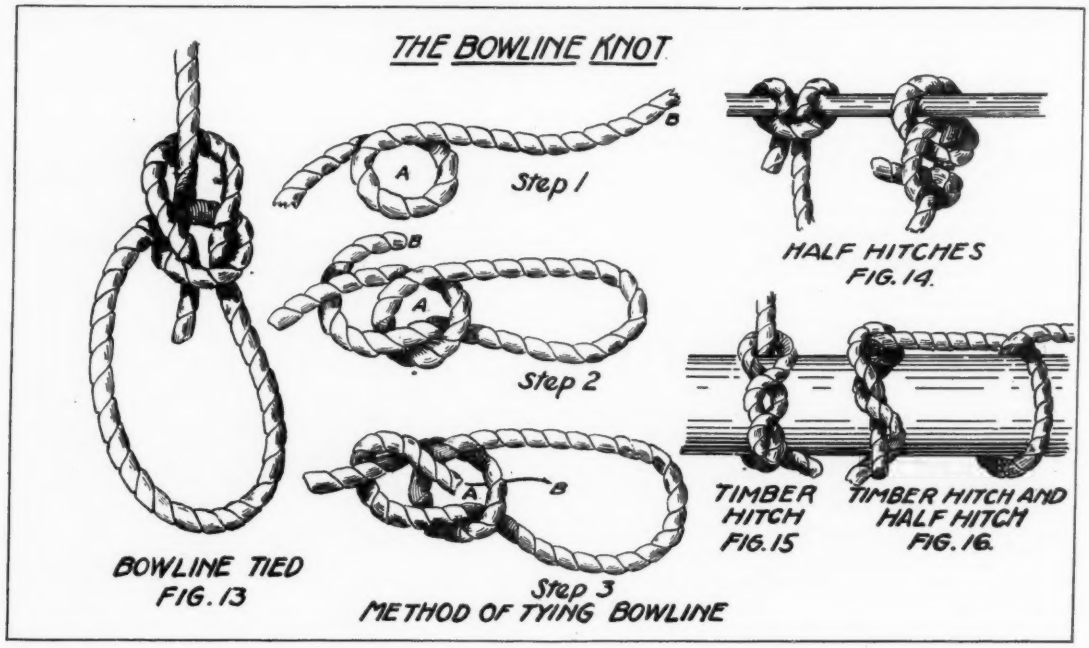
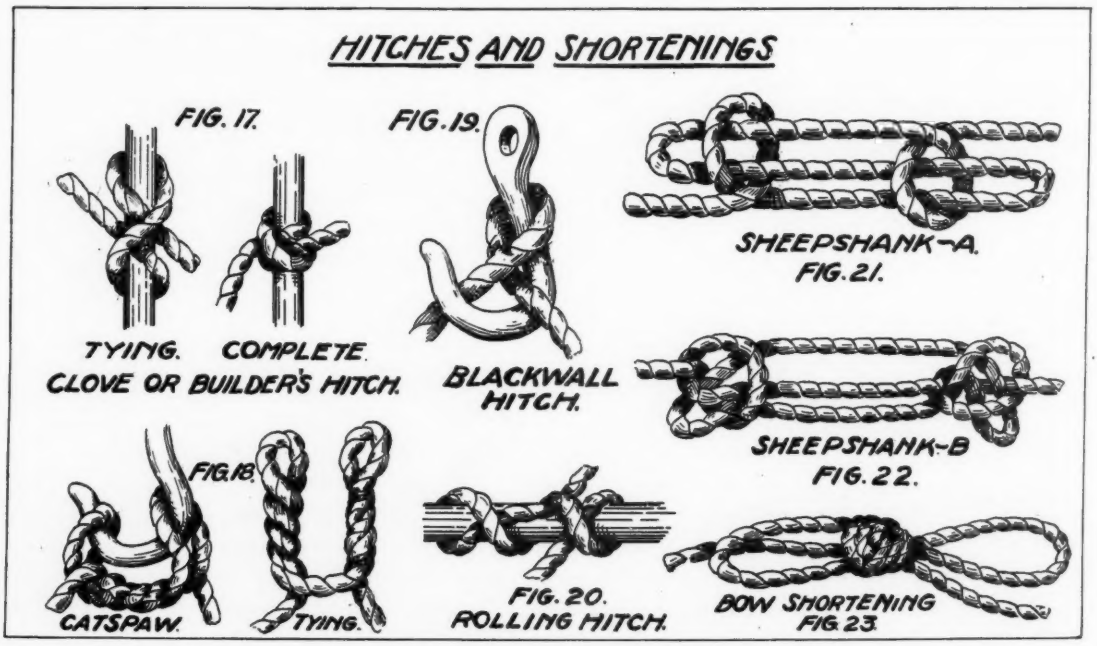


PLATE 5



In tying, hold the standing part in the left hand, pass the rope around the pole; across the standing part. Make a second turn around the pole and pass the end under the last turn.

Fig. 18 gives the "Catspaw," a very useful hitch for use when hoisting with a hook. This is formed by passing the bight of the rope over the end and standing part; then, with a bight in each hand, take three twists away from you; bring the two bights side by side and throw over the hook.

Fig. 19 is a simple "Blackwall Hitch, used also to secure a rope to a hook. The end is slipped around the hook and under itself, as indicated. When pulled tightly, it holds the end firmly.

Fig. 20 is the "Rolling Hitch," which is somewhat similar to the "Clove Hitch," and is used for the same purposes.

Fig. 21, A, is one of the many "Sheepshanks." These hitches are used in shortening rope. The amount to be shortened is gathered up and a half hitch is made around each of the bends as shown in the drawing. Fig. 22, B, is another "Sheepshank," a little stronger, perhaps, than the first method.

The "Bow Shortening," Fig. 23, is a fair method of taking up rope where no great strength is required. This is quite useful in lashing up a trunk or box.

An Exhibition of Furniture from the Workshop of Duncan Phyfe[1]

The Metropolitan Museum of Art, New York City, from October 16 to December 15, showed in its large gallery, D6, a group of more than one hundred examples of furniture from the workshop of Duncan Phyfe, the New York cabinet-maker. The pieces which were all from New York or its immediate vicinity and showed a considerable range of design, nevertheless were limited to Phyfe's best period, which dates before 1825. The exhibition was probably the most important group ever gathered together by a single American cabinet-maker. Phyfe is an American cabinet-maker to whom it is possible definitely to attribute a large group of furniture upon other than circumstantial evidence.

The first quarter of the nineteenth century, like all transitional periods, was one of the most important in history. Assured of its independence, the new republic was testing its strength in internal affairs and in its relations with other nations. In New York City this activity in the nation was reflected in concentrated form. The character of the city had changed from that of a provincial town into the beginning of a cosmopolitan metropolis. The little Dutch town, with a sprinkling of English downrightness, had changed to one whose flavor was dominantly French.

Expression to this change was given artistically, economically and scientifically. An indication of the increasing prosperity of the city was the building of handsome homes. These required furnishing in the prevailing taste which was growing more and more sophisticated. To Duncan Phyfe had come the patronage of the most prominent people of the time, and in his work may be seen one form of the record of the tastes and custom of his day, its cultural quality and commercial prosperity.

Phyfe's importance in furniture making is two-fold. First, it forms a record of a day which is gone. Second, his importance arises from the fact that he, as the heir of the great cabinet-makers of the end of the eighteenth century, carrying on the traditions of fine design and craftsmanship well into the nineteenth century, presents in his work an example to modern cabinet-makers of the manner in which furniture for contemporary use may be designed in the terms of ancient tradition.

Duncan Phyfe began his trade of cabinet-maker in Albany. Attracted by the fame of New York City he went to the metropolis early in 1790, where he made a connection with the family of John Jacob Astor. This meant a start in business under one of the wealthiest families of the day.

A DUNCAN PHYFE TABLE.

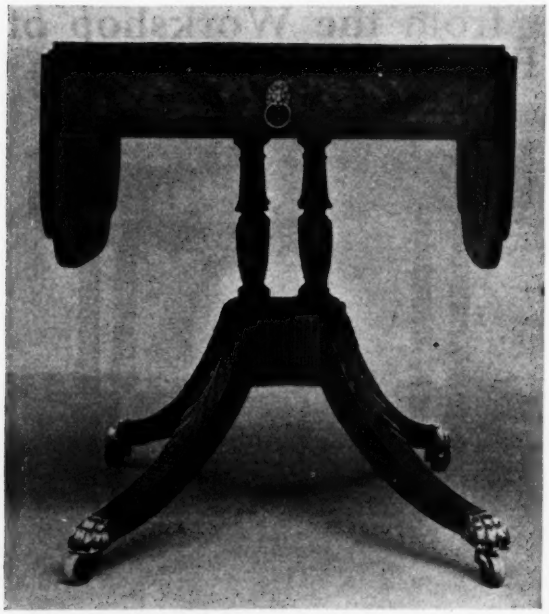
At first his work was purely Hepplewhite and Sheraton, but by 1802 or 1803 the artistic influence of France which was beginning to be felt in New York, brought to him certain elements of Directoire, Consulate, and early Empire origin. These he combined successfully with the English forms and details with which he was familiar. Still later the full French Empire style came into vogue and much of his furniture became simplified and ornamented in a restrained manner with gilt-bronze, producing the qualities of good craftsmanship and material, as well as intelligent design. With the period of black walnut furniture, he entered with the public of his day on the downward path of bad taste along which there was for some time no return.

The work of Duncan Phyfe, as shown in the museum exhibition, falls into certain definite groups. His principal output consisted of chairs, tables and sofas. In addition to these, he made a number of incidental or important pieces of furniture for special use. Although he is not supposed to have done very much case furniture, that is, pieces with drawers and containers, there is a limited number of such pieces as sideboards, dressing tables and serving tables.

Among the side-chairs which are shown, there are those with Sheraton influence predominating—horseshoe seat, reeded diagonal or curved cross-bars in the back, reeded legs and seat-rail. A second type preserves the back and seat of the first type but the front legs are reversed curves treated on the outside surfaces with a carved acanthus leaf. The full Directoire influence is seen in the most typical of Phyfe chairs, those with the lyre back and legs carved in either the acanthus pattern or the dog-foot pattern, and those with a similar variety of legs but with a slat in the back made up of an oval medallion between carved scrolls. A type dating from about 1815 has legs made up of early Empire form. All of these general types of chair occur with arms, although such are very rare.

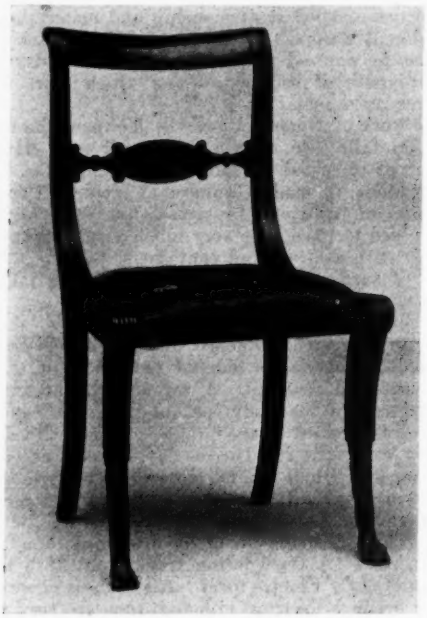
A TABLE SHOWN IN THE PHYFE EXHIBITION.

[1]Photographs from the Metropolitan Museum of Art, New York.



A TABLE IN THE PHYFE EXHIBIT.

The variety of tables is large. They may be divided into three groups based upon structure: the tables supported upon legs at the corners, those supported at the ends by coupled colonnettes or lyres, and those supported upon pedestals. The first type stands either upon straight or reeded legs, or as in one rare example, on legs made up of a reverse curve, carved with acanthus and dog foot. Of the type with pedestals there are three kinds. The first is that with a small platform supported on curved legs and in its turn supporting crossed lyres below the superstructure of the table top. The second variation is of this kind but has instead of lyres four posts or colonnettes. The third kind has an urn-shaped, turned member, from which curved legs, three or four in number, sweep outward. Into these various classes fall the tables which are shown in the museum building.



AN EMPIRE CHAIR OF PHYFE MAKE.

There are sofas corresponding in type to the chairs. The most characteristic is of Sheraton derivation, with a wooden back-rail paneled, carved, or both, wooden framework to arms and seat, and straight reeded legs. These sofas are either upholstered or caned. A different type shows the introduction of Directoire influence, the curved arms, ajoure, set with delicately carved lyres. The third type introduces more of the Empire influence, though it preserves many of the lines of the Directoire piece. Of this latter type, the legs in one case are made up of a lion foot and eagle wing, while in a second variety are seen the crossed reversed curves of Consulate and Empire provenance. In all of these sofas there is a certain consistency due to the repeated use of the same carved decoration. Of miscellaneous furniture the exhibition shows a group which includes a piano, a sideboard, a pier-glass,

A FINE EXAMPLE OF A PHYFE CHAIR.

buffets and serving tables, a man's dressing table, and wash stands. It includes also a fine four-post bedstead loaned by Mrs. Robert DeForest.

Some of Phyfe's details are witness to the love of the craft and the pride of workmanship which pervades all of his work. A most apposite example of this is the delicately veneered corner-block which occurs on many tables. The veneer in rectangular or curved form is so unobtrusive as to escape the eye of any but a connoisseur.

In arranging the exhibition an effort was made to place the furniture in conjunction with various objects of decorative art of the same period. This assisted greatly in modulating between the delicacy of the furniture itself and the hugeness of the gallery in which it was shown. The true effect of the fine mahogany upon which Phyfe lavished such careful attention was thus seen in association with the colors and gilding of the particular period. About twenty individuals loaned typical pieces of Phyfe furniture to the museum for this exhibition which had for its purpose the improvement of the quality of modern cabinet work and an increase of discrimination in public taste.

PROBLEMS AND PROJECTS

The Department of Problems and Projects aims to present each month a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration. The editors will not accept the old hackneyed problems of footstools, taborets, towel holders, etc., which have been made from time immemorial, ad nauseum.

Drawings and manuscripts should be addressed The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

PRINTERS' QUOIN.

Herbert D. Harper, Rochester, N. Y.

If there is a printing shop in your school the Printers' Quoin provides a useful project. The five teeth are made similar to a rack, 7/16" pitch, width of each tooth 1/8". The space between teeth is 5/32". The depth of the space is 5/32" full with the exception of the two end spaces where the dimensions are shown in the drawing.

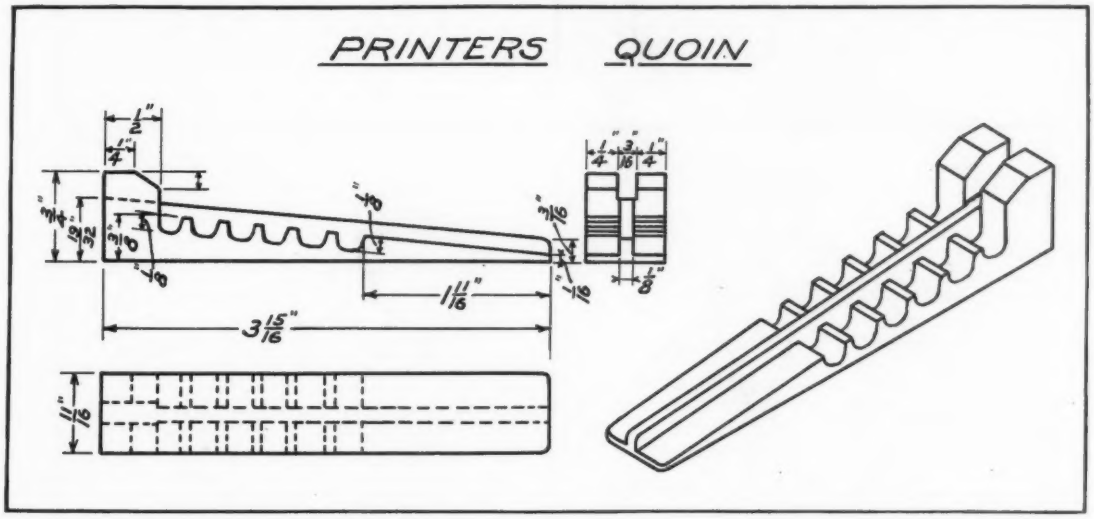
The quoin is made of machine steel and the valleys are cut with a convex cutter on the milling machine. By using the graduated collar on the cross feed the exact center distance can always be obtained.

AN ANTIQUE BRONZE LAMP STANDARD.

A. F. Bick, Milwaukee, Wis.

The object of this article is to present a problem and a wood finish, that cannot fail to attract attention, and gain the interest of the boy.

The finish cannot be used on every variety of work, but is ideal for jewel boxes, small tables, lamps, and similar objects. There is much educational value in the manner of application, and in the selection of color combinations. As a means of developing creative ability, it is on a par with the woodwork itself.

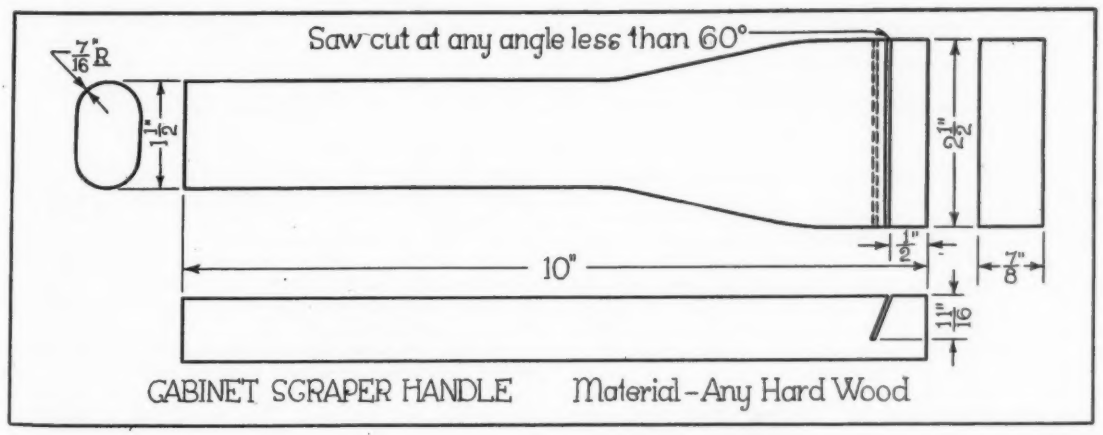


CABINET SCRAPER HANDLE.

Emery Smith, Three Rivers, Mich.

The cabinet scraper handle is a small project which will help use up small pieces of scrap lumber. It works out well where there is plenty of scraping to be done, and requires only the common hand tools to make.

The design is first drawn on faces one and three, of a 4"x4"x8" glued white pine block, and faces two and four are chiseled down as shown in Figure 1. Center lines on all four sides, and horizontal lines an inch apart all around the block, are then drawn, and the pattern one, face, one, transferred to faces two and four, by pointing



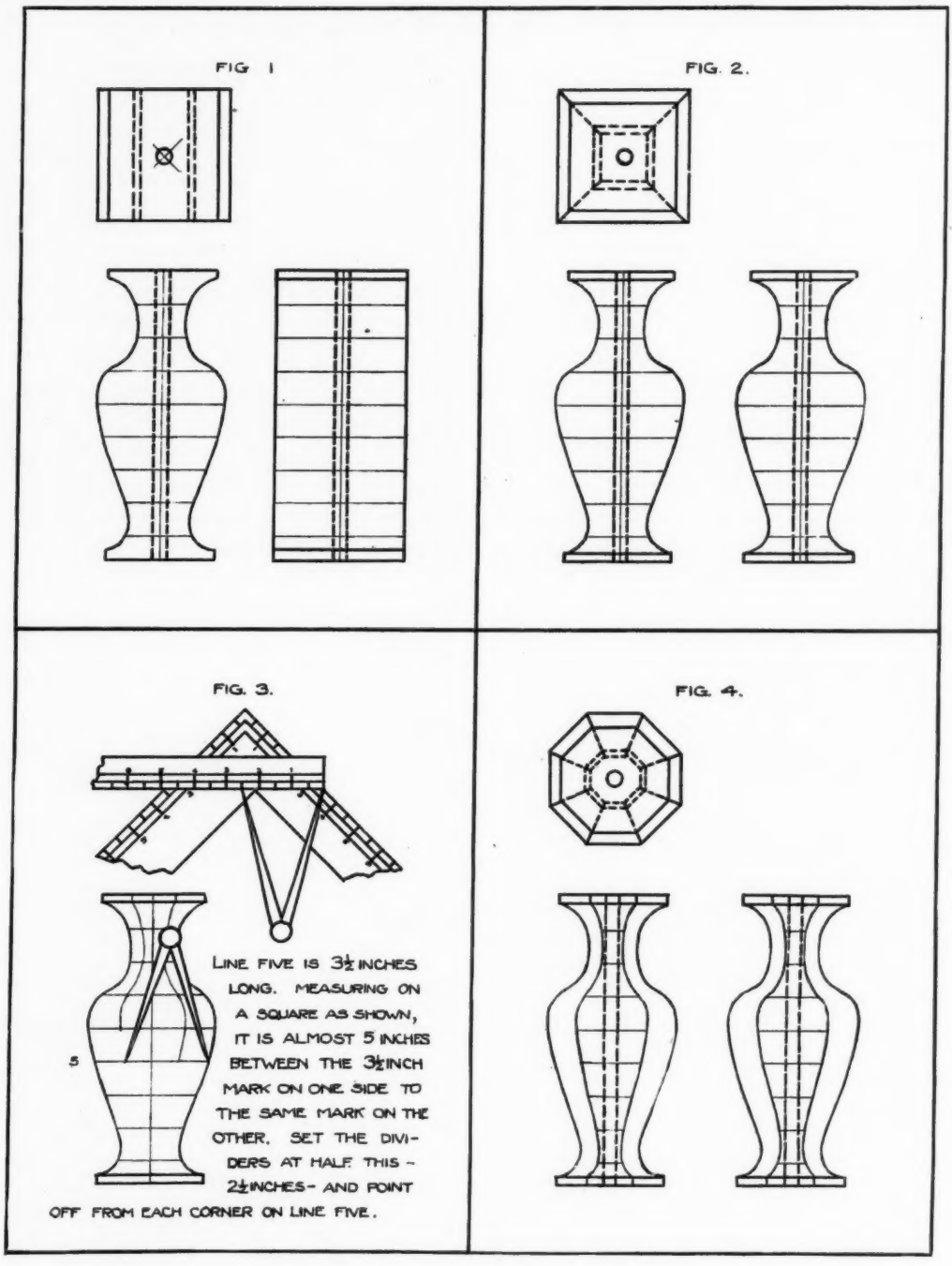


FIG. 1
FIG. 2.
FIG. 3.
FIG. 4.
LINE FIVE IS 3½ INCHES LONG. MEASURING ON A SQUARE AS SHOWN, IT IS ALMOST 5 INCHES BETWEEN THE 3½ INCH MARK ON ONE SIDE TO THE SAME MARK ON THE OTHER. SET THE DIVIDERS AT HALF THIS - 2½ INCHES - AND POINT OFF FROM EACH CORNER ON LINE FIVE.
5

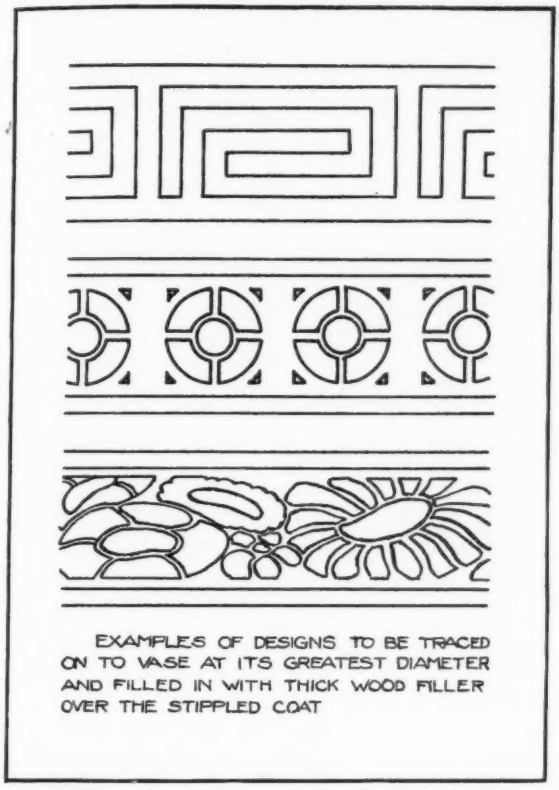
DETAILS OF MAKING ANTIQUE BRONZE FINISH LAMP.

off with a pair of dividers on each corresponding horizontal line.

After this is done, and faces one and three chiseled as shown in Figure 2, all four sides are marked in order to cut the square into an octagonal vase. Measure on each horizontal line in turn, a distance calculated on the corner of a framing square, as shown in Figure 3. Carefully trim the corners to the lines so that each of the eight resulting corners, when looked at squarely, appear as a perfect vertical line. (Figure 4).

Now, as to the finish, first a heavy coat of paste wood filler is allowed to set a few minutes. This is stippled vigorously, until the vase has a rough appearance, and is covered uniformly with fine points, brought up as high as possible with the brush. An old short bristled stiff brush is the best for this purpose. If the filler is not stiff enough, the surface will appear merely mottled and should be left to stand a bit longer. However, if it is too stiff, the filler will peel from the wood, and a little thin filler should be added to the brush.

When the stippling is done, the work is allowed to harden for a few days, and then sanded in such a way, (very lightly, of course), that nothing but the tops of the fine points are removed. The sandpaper is held on a


EXAMPLES OF DESIGNS TO BE TRACED ON TO VASE AT ITS GREATEST DIAMETER AND FILLED IN WITH THICK WOOD FILLER OVER THE STIPPLED COAT

SUGGESTIONS FOR ORNAMENT ON BRONZE FINISH LAMP.

block, for the surface is to be flat, representing the primary surface of the vase. The mottled surface under it is to seem as if caused by corosion.

It is in the use of the stippling medium, (whether crunched paper or brush), and in the variety of pleasing color combinations, that might be produced, that the boy may show his ingenuity. The idea was to imitate antique bronze, and therefore the brush and sandpaper were used, as explained. Following this, the vase was coated with a thin gray paint. This was allowed to dry, and then covered with a bright green paint, which was immediately rubbed off, leaving only a thin film of color on the surface, and a hue which was quite bright in the deep places, giving the appearance of antique bronze.

TURNED WOOD FRUIT BOWL MADE BY A PUPIL OF MR. BICK. THE FINISH IS LIKE THAT SUGGESTED FOR THE LAMP.

A GARDEN APRON.

Katherine H. Scott, Normal, Ill.

Fashioned to fill the need of an amateur gardener is this simple apron of unbleached muslin or checked gingham with appliqued design of bright-colored sateen flower shapes grouped in the center as flowers in a basket. A strap of plain material, finished on the edges with a bias fold of sateen to harmonize with the color of the flowers, is sewed through the center of the design from the band at the waist to the space below the edge of the pockets. This forms the handle of the basket while the body of the basket, which is brought up from the fold, and stitched along the edges of the sides with a bias fold, completes the design. A band with wide strings and tiny appliqued flowers finishes the upper edge of the apron and dangling from each side of the pocket space, conveniently hang a pair of scissors for clipping stems, and a decorated metal shoe-horn to be used as a trowel.

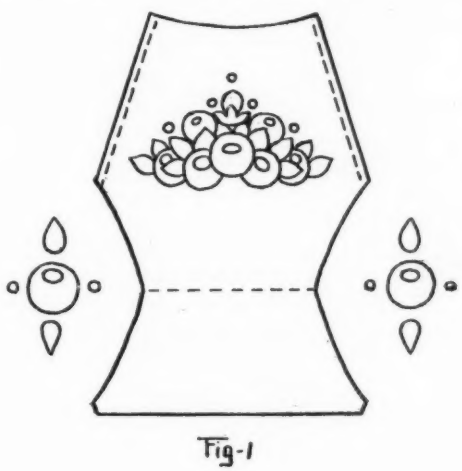


Fig-1

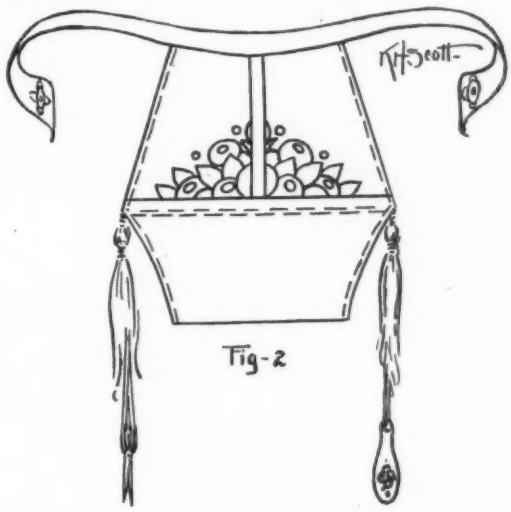
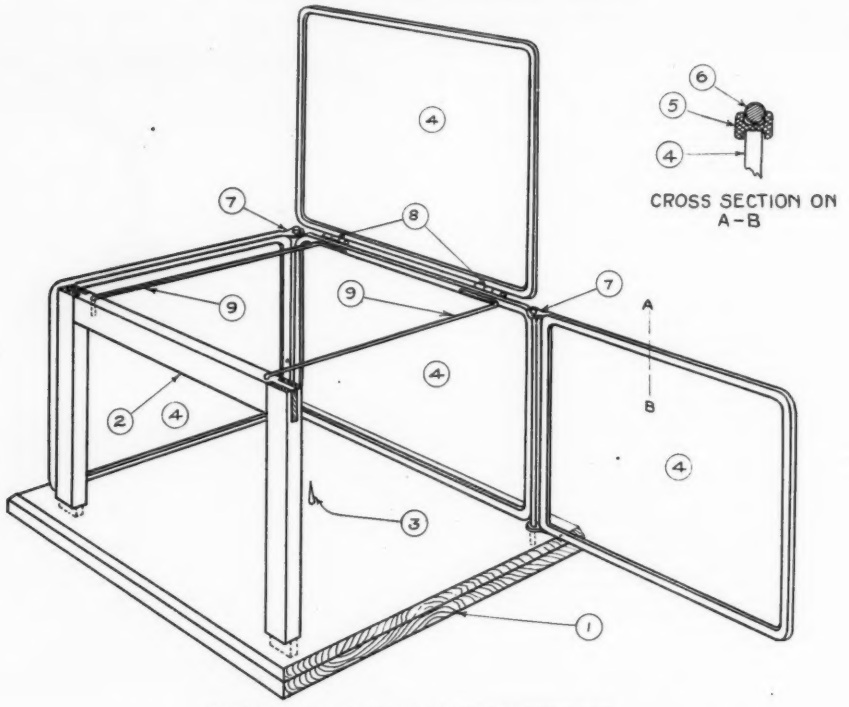


Fig-2



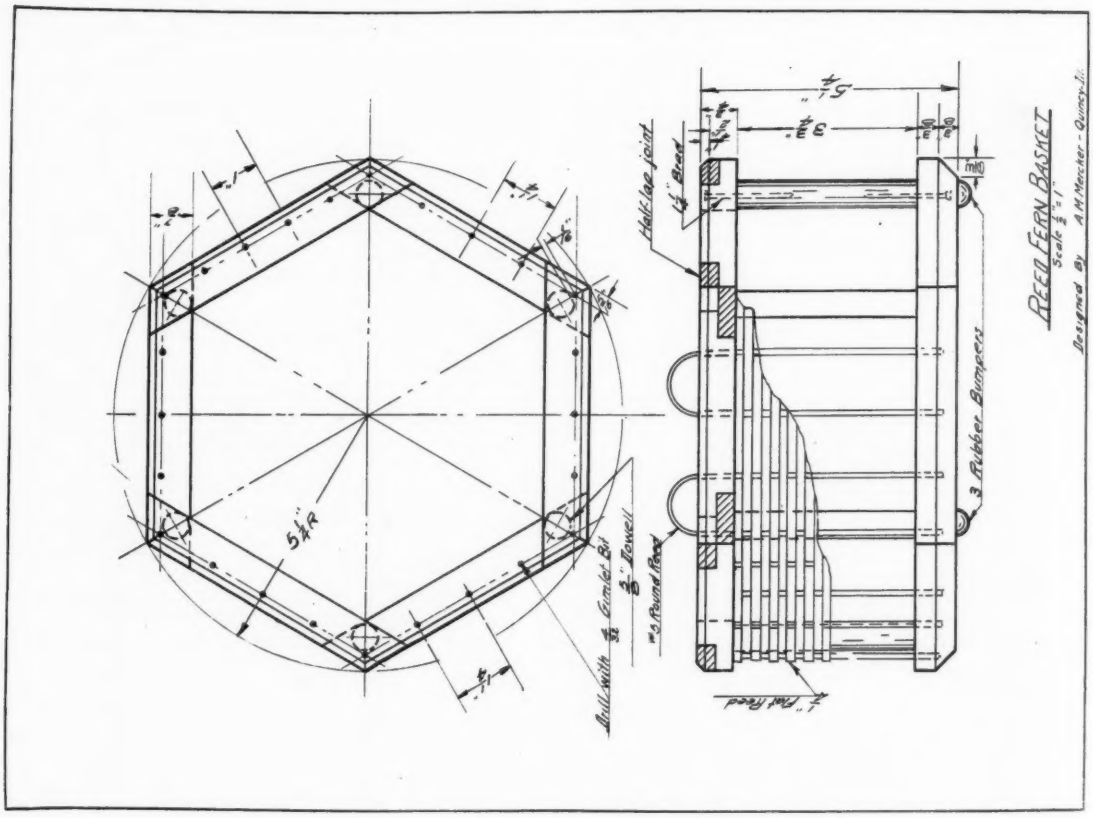
DETAILS OF A HOME MADE PROJECTION BOX.

Seed packs may be found in the pockets as well as a small water can tucked safely away in an inner elastic band. The water can, an empty spice box, is decorated with the same design, done in enamel paint.

A "HOME MADE" PROJECTION BOX.

Charles W. Frost, Instructor of Machine Drawing, Central High School, St. Paul, Minn.

This projection box has proven of considerable value as an aid to teaching elementary mechanical drawing, yet



is so simple in design that almost any boy should be able to duplicate it.

The method of construction employed is shown quite clearly in the drawings, and requires no comment or explanation. The leaded glass channels can be obtained from any large dealer in glass, or from those firms advertizing "hard to get manual training supplies" in THE INDUSTRIAL ARTS MAGAZINE.

The steel wires which reenforce the lead frames are soldered into the outer grooves of the channel surrounding the glass sides and top of the box. As shown at "7" the ends of these wires are flattened and drilled to form the hinges for the sides of the box.

It is customary to use common chalk with the projection box, hence the glass must be treated in some manner to render it rough enough to "hold" the lines. This is most easily accomplished by applying a light coat of varnish to the outer surfaces of the glass, and rubbing it down with powdered pumice stone before it is quite dry. The wooden parts should also be finished with varnish.

List of Materials Required:

3 pieces single strength glass 6½"x8".
1 piece single strength glass 8½"x8¼".
8 feet leaded glass channel.
8 feet steel wire.
1 pair butt hinges, steel, ¼"x1".
1 piece hardwood ¾"x10½"x10½".
1 piece hardwood ½"x¾"x24".
Small quantity varnish, pumice stone, solder, glue and sandpaper.

Names of Parts:

1. Base.
2. Front frame.
3. Pivot pin.
4. Glass sides and top.
5. Lead channel.
6. Wire reenforcement.
7. Side hinges.
8. Butte hinges.
9. Connecting wires.
10. Protractor scale.

REED FERN BASKET.

A. M. Mercker, Supervisor Manual Training, Quincy, Ill.

This project was designed to combine reed and bench woodwork in a simple and inexpensive, yet attractive and usable project.

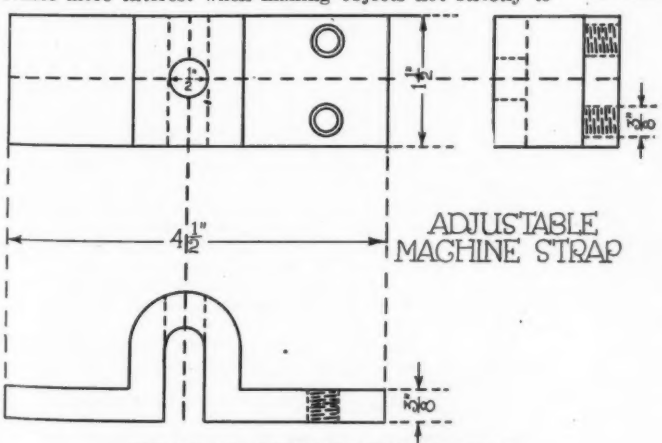
To give the finished basket a more attractive appearance, the woodwork may be finished in a dark mahogany contrasted with a dark green color on the reed. The woodwork should be assembled, stained and varnished, two coats before weaving. The reed should be first stained, then after several hours soaked a few minutes in warm water and woven. The flat reed finishes better, if sanded before staining. When the weaving is finished and the reed thoroughly dry, a thin coat of varnish should be applied to the reed.

AN ADJUSTABLE MACHINE STRAP.

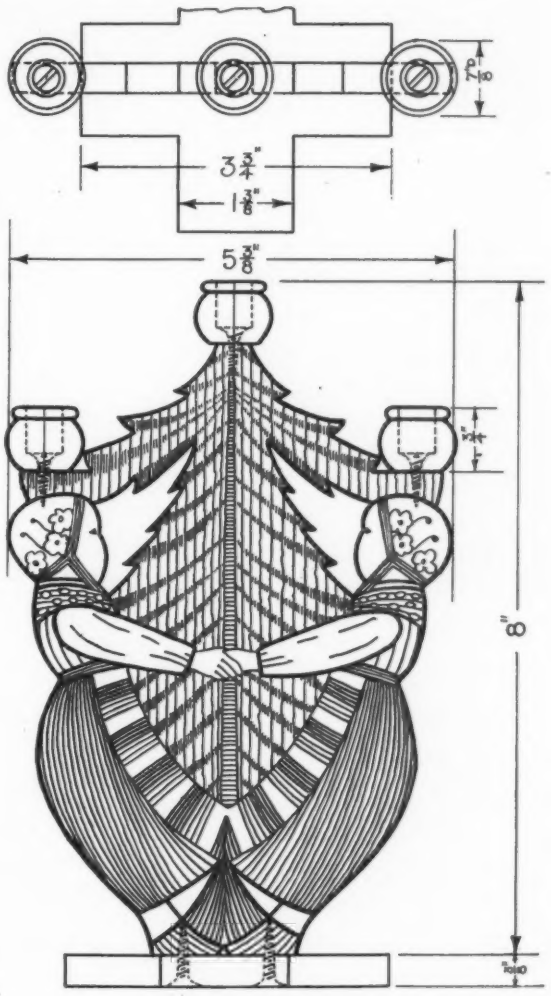
Harry Moore, Rosemount, Montreal, Canada.

It is the contention of some instructors that pupils evince more interest when making objects not strictly to standard form. .Providing utility is not sacrificed just for novelty's sake, it is desirable to use from time to time examples that depart from the usual practice. In this connection there is presented in the drawing a machine strap which possesses the novel feature of being adjustable for height. The main part of the problem is the bending of the strap to shape. This is best accomplished by first bending the piece at right angles and then forming the loop, after which another right angle bend is made at the other side. The strap thus formed is then sawed off the main piece and a clear hole is drilled in the center of the loop to take the tightening bolt. Two holes are drilled and tapped to take the cap or set screws which make the strap adjustable. In use the screws are adjusted, suiting the height of the work to be strapped to the machine table. The purpose of the loop is to afford the wrench, which is used in tightening the nut on the bolt, good clearance when the adjusting screws are high up. The screws would be considerably in the way on a flat strap.

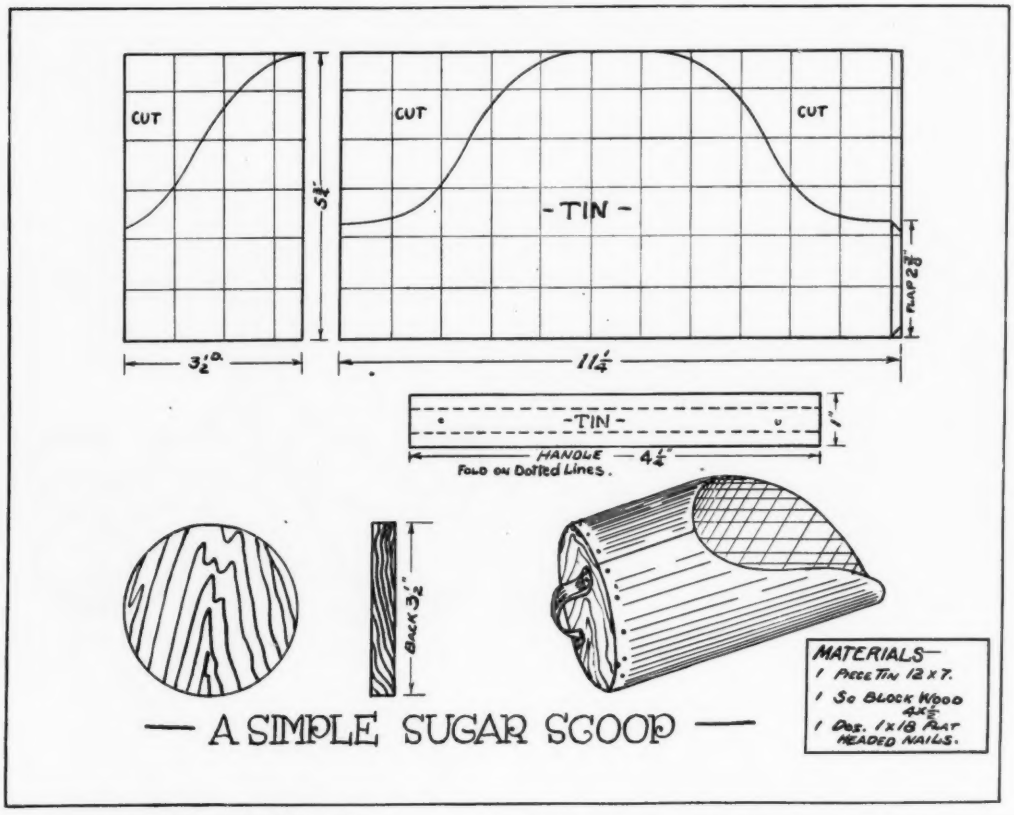
The dimensions given are for straps to be used on a light or medium-size work. For such a purpose one of these straps will be found a considerable improvement over the usual type packed up with odds and ends.



DETAILS OF ADJUSTABLE MACHINE STRAP.



SWEDISH CANDLESTICK.



SWEDISH CANDLE-STICK.

Lee M. Klinefelter, Norfolk, Va.

This little candle-stick was originated in Sweden, and the costume worn by the little girls dancing around their Christmas tree is the national costume of those living in the "Dalarne", or lowlands.

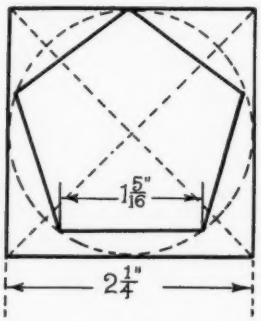
The base and stand are sawed from well seasoned stock about ⅜" thick. Glued up veneered stock is ideal for the purpose. The base shown is only a suggestion of the many possible shapes. The little candle cups can be turned out on a lathe, but if this is not convenient they may be whittled from spools and smoothed up with sandpaper. If made from spools they should be held on with short dowels instead of screws.

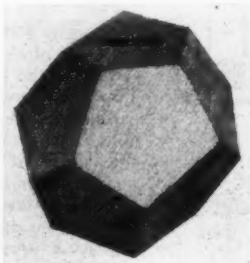
After assembling, give the candle-stick a thin coat of shellac and then paint on both sides with oil colors.

MONEY BANK.

Herbert D. Harper, New York, N. Y.

The money bank is a good project for a first-term sheet metal student. Not only is it interesting to the





boy but it should appeal to a teacher, because it can be made out of scrap around No. 28 gauge. Pieces cut 2¼" square will make a pentagon 1 5/16" on each side. Twelve pieces are required, ten of which are used for the sides, and one each for the top and bottom. The top piece has a slot cut in the center, ⅛"x1". The pieces are soldered together from the inside, except the last two.

SUGAR AND FLOUR SCOOP.

F. W. Barnett, Piedmont, Calif.

For a class in the fifth or sixth grade I have found that the problem shown in the diagram creates a great deal of interest with practically no expense and the completed scoop finds a welcome place in the home.

The boys were asked to bring tall, empty coffee cans and with a little help from the instructor the developed scoop was cut out. The rest of the problem was left to the boy. The flap may be cut off or soldered. In our school the soldering was done by an upper grade in household mechanics.

SOLDERING: THINGS TO KNOW.

1. The best coppers are forged.
2. One-half and one-pound pointed coppers are the most useful.
3. Commercial solder known as "half-and-half" is half lead and half tin, and is best for general use.
4. It may be bought in sticks or wire.
5. A flux prevents the oxidation of the metal to be soldered.
6. The presence of oxide like the presence of dirt would prevent the solder from adhering as it would be between the metal and the solder.
7. Rosin is used in soldering Tin Plate, bright Copper and Lead,—either powdered or dissolved.
8. Chloride of Zinc is made by cutting muriatic acid with zinc. It is used for soldering old work, galvanized iron, zinc, copper, and brass.
9. Raw muriatic acid, otherwise called hydrochloric acid is used for zinc and galvanized iron.
10. Borax, powdered or dissolved, is used for brass.
11. A too strong flux will do harm to the work and to the tool.
12. Commercial soldering paste is a convenient flux.
13. A gasoline blow torch is desirable for heating copper.
14. The soldering copper must be kept clean and well tinned.
15. A good soldering flux must be used, and one which is suited to the metal.
16. The metal to be soldered must be clean.

OFFICERS AND MEMBERS OF COMMITTEES OF THE SCHOOL CRAFTS CLUB, NEW YORK CITY.

Reading from left to right—Standing: Russell F. Hemion, Frank A. Baker, Lloyd F. Stair, Albert N. Petterson, Samuel Tanenbaum. Sitting: Treasurer, Charles H. Kennington, Ann Street School, Newark, N. J.; President, Philip M. Wagner, Cleveland Junior High School, Newark, N. J.; Vice-President, Edwin F. Judd, High School, Montclair, N. J.; Secretary, Frederick C. Arnold, Evander M. Child High School, New York City.

17. The metal, at the point where it is to be soldered, must be raised to a temperature slightly above the melting point of the solder.
18. A satisfactory swab for applying zinc chloride is a small brush, or cotton waste wrapped around a stick.

Preparing Zinc Chloride.

1. Select a clean glass container
2. Pour in muriatic acid
3. Dilute with water, using ⅛ to ¼ as much water as acid.
4. Add small clean pieces of zinc. (If the zinc is dirty, first clean by dipping in muriatic acid.)
5. Allow zinc to remain until there is no further action.
6. When stirring use glass rod or piece of wood.
7. Strain, using filter paper or several thicknesses of cheesecloth.
8. When using zinc chloride (cut acid) dilute with one or two parts of water.

SOLDERING.

I. Tinning Copper.
   a) Clean copper (using a file)
   b) Using Sal Amoniac
      1. Heat to proper temperature
      2. Clean point with Sal Amoniac
      3. Melt sufficient solder on Sal Amoniac to cover point of copper
      4. Tin point by rolling in tin the melted solder
   c) Using Rosin
      1. Select a very soft building brick
      2. Scrape out a channel in the brick with a cold chisel ⅛" to ¼" deep
      3. Leave the gritty substance in the channel; the copper in rubbing against this substance makes for better tinning
      4. Heat the copper
      5. Melt a piece of Rosin about the size of a hen's egg in the channel of the brick
      6. Add a piece of solder
      7. Rub the hot copper on all sides in the bath of solder and rosin until the copper is properly tinned.

Soldering a Hole in a Utensil.

1. Copper must be ready and placed over heat
2. Scrape around hole until it is bright
3. Swab with zinc chloride
4. Place point of copper in hole, melting solder around it. When the copper is taken out the solder will flow, filling the hole.

DECEMBER MEETING OF THE SCHOOL CRAFTS CLUB.

Round table exhibitions, demonstrations, and discussions of allied subjects dealing with the teaching and supervision of manual arts and vocational training have become so interesting and helpful to members of the School Crafts Club of New York City and vicinity, that another program of this nature was given in the last monthly meeting on Saturday, December 16th, at 8 P. M. in Lyons Restaurant, New York City. Fully one hundred men were present. Before the program started a large number gathered at 6 P. M. for an informal dinner in the same restaurant.

The following new members were voted upon and accepted: Gabriel Cobelli, Jersey City, N. J.; Otto Schants, Irvington, N. J.; Julius Singer, New York City; Percival L. Warner, Jersey City, N. J.; Jerome B. Scott, Hackensack, N. J.; and Harold A. Pinney, Newark, N. J.

Four separate round tables were carried on with these subjects respectively: Recent developments in radio; the school magazine as an aid to the school spirit; projects in wood working, grades fifth to eighth, and ways and means of equipping a shop with a limited budget.

The Radio table was in the hands of Mr. Edwin F. Judd, Instructor of Shopwork in the high school at Montclair, N. J.; Mr. Martin J. Corcoran, Director of Manual Training, Elizabeth, N. J., and Mr. John M. Dockstader, Manual Training Instructor, Perth Amboy, N. J. All types of radio receiving sets were shown—assembled and in parts—from very simple crystal sets costing a very small amount to construct, to vacuum tube sets with several stages of amplification. Mr. Judd spoke of the possibility for correlation with science and geography, differences in efficiency of vacuum tubes, best types of tuners to make or buy and variability of aerials. Mr. Dockstader exhibited a tube set using plate glass for the panel, making the outfit fine for demonstration purposes. Besides explaining and showing the methods used in glass drilling, he demonstrated the construction of grade problems such as storage B batteries, vario-couplers, and variable condensers. Mr. Corcoran stressed the more expensive vacuum tube sets for advanced classes. He exhibited a set which was a model in respect to circuit connections, all terminals of which were neatly soldered.

Mr. R. Elmer Throsswell, instructor of printing in the Cleveland Junior High School, Newark, N. J., gave his group very helpful suggestions relative to the school magazine. He spoke of the correlation possibilities with other junior high school departments; commercial, Eng-

lish, art, and manual training. Furthermore, he made clear how unfair it is to pupils, teachers, and the printing trade for the school authorities to expect the school printing shop to get out all the necessary printed forms used in the school system. Also he said that good results could not be expected unless the necessary equipment and supplies were furnished by the board of education. Lastly he appealed to fellow printing teachers to help each other with the solution of problems, suitable projects and methods.

Mr. Richard O. Reger, instructor of Manual Training in New York City, told how he revised his course of study to include more than the old type woodwork problems. His projects now include: Toys, model bridge construction bringing in strength of materials, concrete boats and door stops, electric wiring, staging for pageants, and practical articles for school purposes.

Mr. Lawrence J. Young, Assistant Director of Shop Work, New York City, led the discussion at the table considering ways and means of equipping a shop with a limited budget. He spoke of the proper channels to use in making the budget sufficient to meet the needs. A whole hearted discussion followed as to the equipment that should be installed. Primarily this depends on the ends and course of study. Suggestions were given as to the uses of a questionnaire sent to industrial and educational leaders. Many thought the use of second hand machinery inadvisable because of the necessity of too much care in installation and upkeep. Besides, the many purpose shop was discussed. It was decided that plumbing and sheet metal could well be combined because of similarity of equipment. Likewise machine work, automobile repairing, ignition, and electricity could be taught in the same shop to advantage. Mr. A. W. Garritt, Director of manual training, New York City, cited the need for a shop to take care of craft-minded children which would have apparatus for wood-block print cutting, clay modeling, jewelry, and copper work. Also he said a woodshop with power machinery planned to take care of thirty pupils, should have a floor space measuring at least twenty-five feet wide by sixty feet long.

The evening training class for vocational teachers carried on by the state of New York visited the Club in a body. Mr. Lawrence J. Young, who has charge of this school, believes that visits of this nature where the learning teacher meets the profession in a social and technical way, offer to the teacher invaluable inspiration to carry on. The visit is credited as a regular session of teacher training work. Thirty-six men were present.

The Club lost two members through death recently. Mr. Edward M. McCord, Teacher of Shopwork, New York City, passed away on October 19. Mr. Harry O. Clark, Director of Manual Training in Paterson, N. J., died on October 28. At the funeral of the latter were present all the executives in the Paterson School system.—Lloyd F. Stair.

BOSTON CLUB HOLDS GET-TOGETHER MEETING.

On Saturday evening, December 16, the Vocational Education Society of Boston held its annual get-together meeting at the Hotel Bellevue, Boston. M. N. Stratton, president, was toast-master.

Mr. John C. Brodhead, Assistant Superintendent of Schools in Boston, spoke on "Reminiscences". Mr. Brodhead was the first president and one of the seven charter members of this club which is celebrating its twenty-fifth anniversary. Mr. Brodhead told how the club was established as the result of a conversation in the wood-carving shop at the Elliott School in Boston, 25 years ago. Messrs. E. C. Emerson, Frank Carter, George Hatch, John Brodhead, James Clarke, and J. H. Trybom, the charter members were all instructors in the manual arts department of the Boston schools at the time. Mr. Brodhead claimed for Massachusetts and Boston that the Boston Manual Training Club, now the Vocational Education Society of Boston, is the oldest organization of its kind in the point of continuous existence in this country.

Those present had the opportunity of hearing an unusually sincere and able address by Henry R. Palmer, Editor of the Providence Journal, of Providence, R. I. Mr. Palmer made a plea for greater art in living. He defined art as a combination of order and beauty and asserted that art in life does not preclude the possibility of life including also adventure, romance, a round of work and duty, but rather that art enhances the value of these other things.

MR. M. NORCROSS STRATTON,
Boston, Mass.
President of the Vocation Education Society of Boston, 1923.

Quite comparable in attractiveness and manner of reception were the other features of the evening's program. Group singing led by Frank V. Gordon with Grant Drake at the piano was most enthusiastic to say the least. Theodore M. Dillaway, a master on his instrument, pleased the members greatly with several selections on the flute. A part of the evening is pictured as follows by the Boston Globe:

"The members enjoyed, as souvenirs, what they have frequently taken from pupils—whistles and lollypops—and forgetting their dignity for the while, they presented an unusual picture decked in varied crepe paper hats of different colors." This meeting was the third monthly meeting of the year. The list of officers for this anniversary year is as follows:

President—M. N. Stratton, Agent, Mass. Department of Education.

Vice-President—Frederick H. Sawyer, Asst. Principal of Boston Trade School.

Secretary—M. J. Moriarity, Co-ordinator of the Charlestown Part-time Co-operative School.

Treasurer—William Benson, Mechanic Arts High School.

Librarian—Martin L. Olsen, Hyde Park High School, Co-operative Branches.

NEW BOOKS.

Fundamentals of Practical Mathematics.

By George Wentworth, David Eugene Smith and Herbert Druery Harper. Cloth, 202 pages, illustrated. Ginn & Co., Boston, New York, Chicago.

As the first volume of a new series of mathematics texts this book is a radical departure in method, content, and even mechanical standards, from the conventional textbook. The authors have assumed that the classes which will use the book will later enter some trade or occupation in which a broad solid foundation of the fundamental operations and principles of arithmetic, geometry and trigonometry are essential. They take it for granted that the boys have had an ordinary arithmetic course and consequently begin the work with an intensive review, emphasizing each principle with typical industrial and trade examples. The new work includes chapters on (a) ratio and proportion, with applications to mechanical devices and drawing, (b) mensuration, including the common industrial uses, geometric constructions, roots, and the metric system; (c) trigonometry and the use of functions; (d) the slide rule and (e) general applications with a wide variety of problems. While the teacher of theoretical mathematics is constantly disturbed at the lack of mathematically comprehensive definitions, the absence of the traditional proofs and the extreme brevity of explanations, he cannot dodge the fact that the work is amply clear, exceedingly practical and interesting and fully complete for the purpose. The student who masters the book

has at hand skill in the use of a complete set of the common mathematical tools that the mechanic, engineer, and draftsman in whatever field must have.

The illustrations are in the shape of "blueprints" and enliven the book as well as illustrate the problems.

Home Instruction for Sheet Metal Workers.

By William Neubecker. Cloth, 406 pages, illustrated. Price $5. U. P. C. Book Company, Inc., New York, N. Y.

This book offers a rather comprehensive course of instruction in the principles and practice of sheet metal work as applied to building construction. The treatment is extremely complete in descriptions of processes and sequence of work. The chapters on skylights, louvres and cornices are especially complete and useful. Illustrations are flawless.

Artistic Wood Turning.

By R. B. Gregg. Price $1.00. Published by the author at 241 Littleton St., West Lafayette, Ind.

This book consists of a series of blueprints illustrating three candle sticks, two table lamps, a bud vase, and a floor lamp. The drawings are carefuly dimensioned and full size templates are provided. The author has a fine sense for delicacy in line and the designs are interesting and artistic.

Mechanical Devices in the Home.

Edith Allen. Cloth, octavo, 251 pages. Price, $1.75. Manual Arts Press, Peoria, Ill.

A recent and logical development in household arts courses including the study of utilities and devices—mechanical and otherwise—which have been developed for the convenience, and comfort of the housekeeper and home maker. This book is the outcome of teaching college classes and presents a well-balanced, carefully arranged series of chapters, describing and illustrating the commonly used labor saving devices in household use. Eleven general classification—cooking stoves, heating devices, lighting devices, coolers, water supply and sewage disposal, laundry equipment, cleaning devices, food preservation, motors and gas plants, measuring devices, and sundry appliances—cover the whole range of home utilities. The author has succeeded very well in simplifying each topic to include only the most elementary facts and the most essential principles. She has generally chosen wisely in using types and models which are most widely used and most economical and efficient. In seeking to be untechnical, however, she is not always accurate or exact, and the legends under a number of the cuts do not give a clue to the exact nature or use of the device. The book should find wide acceptance and should be included in every school library.

Color Cement Handicraft.

By Pedro J. Lemos and Reta A. Lemos. Cloth, 197 pages, illustrated. The Davis Press, Worcester, Mass.

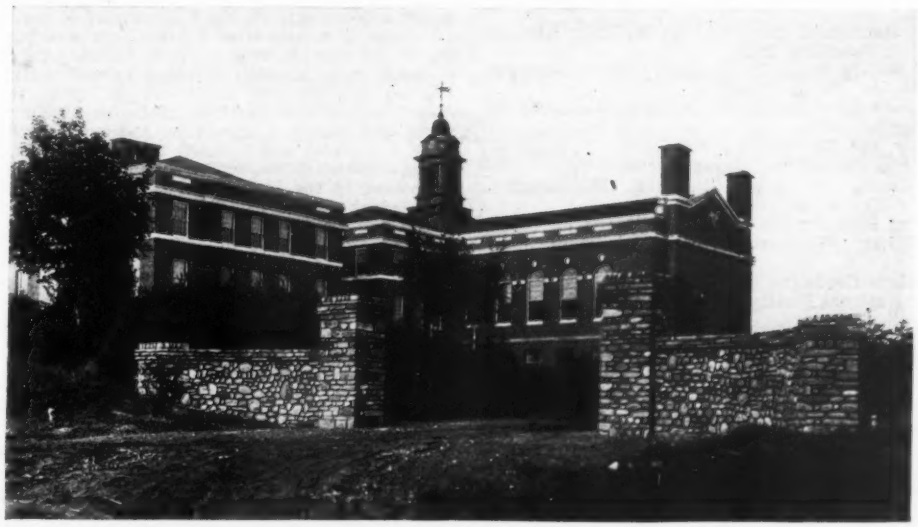
The traditional use of cement for constructional purposes and the recent limitations of its decorative qualities to rough large objects out-of-doors have deprived us of a most artistic material for craft use. While a few hardy pioneers have made tiles and pottery, it has remained for the genial editor of the School Arts Magazine and his sister to make extended experiments and with true Lemosian energy and originality to develop a new school handicraft and a new group of interesting, artistic and useful objects.

The present book describes and illustrates the various types of objects which have been developed with the use of colored cements. It is essentially a text and reference work for the student and craftsman and presents each method and process in that orderly, clear, well illustrated manner which is so essential for beginners as well as finished craftsmen. The projects range from the simplest tiles and vases, to the most elaborate inlaid majolica tiles, sgraffito cement work, garden ornaments, candlesticks and book supports, furniture inlay, wall and floor applications of tiles and carved cement, cement murals, relief decoration, etc., etc. The authors make clear in the chapters on finish that cement has its own peculiarly pleasing qualities of texture and finish which should be developed in preference to imitations of other materials.

The book is beautifully printed and illustrated.

The Identification of True Mahogany, Socalled Mahoganies, and Some Common Substitutes. By Arthur Koehler, specialist in Wood Structure, United States Department of Agriculture. Bulletin No. 1050, May 12, 1922, United States Department of Agriculture. The pamphlet states that over sixty different species of timber have at one time or another been put on the market under the name of mahogany. Some of these are closely related botanically to true mahogany, others look much like it, while some have only a general resemblance, and no relationship which would entitle them to the name. The pamphlet offers a key for the identification of true mahogany, describes the various species, and includes a glossary of wood substances.

Sheet Metal Drafting. By J. W. Essner. One of the courses outlined in trade and industrial education issued under the direction of the State Vocational Department, Little Rock, Ark. The pamphlet gives a list of the minimum equipment required, outlines the organization of the class and offers a number of geometrical problems in line with the subject.



ORNAMENTAL GATEPOSTS AT THE STATE NORMAL SCHOOL, OSWEGO, N. Y.

The ornamental gateposts shown in the above picture are at the rear entrance to the school campus. They were designed by the class in architectural drawing and the construction was done largely by the class in concrete and bricklaying during the Summer Session of 1922. Both of these classes were under the instruction of Mr. Wadsor M. Scoville of the industrial teacher training department. As will be seen in the picture, these gateposts were built of carefully selected field stones and stones from the lake shore. The posts are wired for electric lights but the picture does not show the lights in position.

Much interest was manifested in the work as they were begun and completed during the six weeks of the summer session. They were built by "the force of the school,"—teachers, students, and necessary hired help.—J. C. P.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for subscribers who have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from competent authorities. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Rating Scales for Teachers.

327. Q.:—I would be glad to receive from you a reference list on Rating Scales of Teaching Fitness.—F. T.

A.:—While a great deal has been written on rating scales for teachers in elementary and high schools, practically nothing has been done to develop and test out a rating scale for teachers of vocational subjects. Two scales are, however, available. One, Payne's "Tentative Rating Scale for Teachers of Industrial Subjects," printed in the School Board Journal, May, 1922, page 70.

Greene's "Tentative Scale for Rating Teachers" (Manual Arts and Vocational Art Teachers) in Greene's "Supervision of the Special Subjects." The following is a list of general references:

A New Method of Rating Teachers. W. L. Connor. Jol. of Educational Research, May, 1920.

New York Rating System for Teachers. Elementary School Jol., February, 1922.

Score-Card for Student-Teaching, Placement and Follow-up of Teachers in Service. A. R. Mead. School and Society, Jan. 7, 1922.

What Should Teacher-Rating Schemes Seek to Measure? R. A. Kent. Jol. of Educational Research, December, 1920.

Construction of a Teacher-Rating Scale. C. A. Wagner. Elementary School Jol., January, 1921.

Rating Scales and the Improvement of Teaching. W. S. Gray. School Review, January, 1921.

A Study of the Merit System. R. A. Puffer. Colorado School Jol., December, 1920.

Self-Improvement of Teachers Through Self-Rating. H. O. Rugg. Elementary School Jol., May, 1920.

Development and Use of a Teacher-Rating Employment Card. E. Mendenhall. Techne, June, 1921.

Proposed Plan for Teacher-Rating. W. A. Wetzel. High School Quarterly, October, 1921.

Measurement of Teaching Efficiency. J. B. Sears. Jol. of Educational Research, September, 1921. (A history of schemes and an outline of requirements for measurement.)

Uniform Standards for Judging Teachers in South Dakota. Educational Administration and Supervision, January, 1921.

Efficiency Ratings of Teachers. C. W. Hill. Elementary School Jol., February, 1921.

Practical Rating Scale for Teachers. F. O. Seymour. Oklahoma Teacher, October, 1921.

Ohio Score Card. School and Society, December 29, 1917. Landsittel.

Measuring Rod for Teaching Efficiency. J. H. Clement. Kans. School Magazine, March, 1913.

Teacher-Rating in Large Cities. J. H. Johnston. School Review, November, 1916.

Provisional Plan for the Measure of Merit of Teachers. E. C. Elliott. Wisconsin Dept. of Education, Madison, 1912.

Sample Score Cards for Rating Teachers. Fourteenth Year Book of National Society for the Study of Education, Part II, 1915, A. C. Boyce.

Rugg's Rating Scale for Judging Teachers in Service. University of Chicago Bookstore, Chicago.

Articles in School Board Journal.

Rating Teachers at Newark, N. J. School Board Journal, July, 1922, p. 111.

Scale for Measuring Teachers. R. C. Clark, School Board Journal, February, 1921, p. 39.

How Shall the Merit of Teachers Be Tested and Recorded? E. C. Elliott, School Board Journal, April, 1915, p. 42.

Enamel Paints.

329. Q: Please inform me what to use to make enamel paint dry smooth and fast. I have much trouble because it remains sticky for some time. What can I use to make slow-drying varnish dry rapidly, smooth and free from dust? How is the rubbed finish effect secured on varnished furniture?—W. L. L.

A: Modern enamels are of two types, those formulated on a varnish, gum-bearing base such as Boston Varnish Co.'s "Kyanize"; or a specially processed oil containing no varnish gums, such as Pratt & Lamberts' "Vitrolite". The former type is much the faster drying, although not so durable and long lived as is the slower drying but wonderfully durable material Vitrolite. During warm, and highly humid weather, practically all enamels are very slow drying. They may, however, be greatly speeded up by drying in a warm room, heated to about 85° F. for 48 hours; then set aside in a normal temperatured room about 65 to 70° until thoroughly hardened. It is barely possible that the addition of a half a teaspoon of a high grade gold size japan drier per quart of enamel and well blended in by long stirring with a smooth paddle, may somewhat affect the drying of your enamel. In the majority of cases, however, it is not advised that you change the goods as received from the manufacturer. The same conditions apply to a lesser degree to varnishes, which however, you will find will readily respond to the heat treatment even under conditions of extreme humidity; for it has been conclusively proved that varnishes dry more rapidly the first week in a highly humid room than do those dried in a room of the same temperature but less humidity. It is barely possible that you are using a slow drying "spar varnish" which is long in oil. If such be the case it is recommended that you use a high grade floor varnish as Pratt & Lambert's No. 61 which to my mind is representative of the group of splendid general purpose varnishes. Slowness of drying in present day varnishes is not necessarily a criterion of good quality since very fast drying goods can be readily secured which nevertheless are of fine quality and durability.

A so-called "rubbed effect" is produced by the use of pumice stone, preferably the finest grade known as FF, applied to a felt pad which has been dipped in water. This is rubbed on thoroughly the dried varnish in such a manner as to level the dust nibs and other imperfections so as to bring the entire surface down to a true level of equal tone. The first two coats of varnish should be sanded smooth with a split 5-0 sandpaper; the last two should be rubbed down with a felt pad, pumice stone and water. Great care should be exercised to entirely remove all traces of pumice stone by thorough washing and cleaning of the corners with a brush, followed by wiping with a damp chamois skin. Freshly rubbed work should be allowed at least five hours drying before revarnishing. After the last coat has been rubbed with felt pad, pumice stone and water it should be thoroughly washed, dried with a chamois and cleaned up with a good oil polish. Your attention is respectfully called to a series of articles appearing in the INDUSTRIAL-ARTS MAGAZINE with cuts which will fully illustrate in detail the questions which you have asked.—**Ralph G. Waring.**

NEW PUBLICATIONS OF INTEREST.

Home Economics in Rural Schools. Home Circular No. 13, May, 1922. Issued by the Bureau of Education, Washington, D. C. The introduction of home economics in rural schools is not a question of desirability but of possibility and feasibility. This pamphlet outlines the essentials necessary for teaching the subject, describes the types of food to be prepared, and offers a list of essential articles of equipment for preparing and serving hot lunches. A few typical recipes for hot foods to be served at school are offered for the benefit of rural teachers.

Foreign Commerce Handbook, 1922-1923. Issued by the Foreign Commerce Department of the Chamber of Commerce of the United States. In the space of 31 pages, this publication condenses a mine of information as to sources of service in foreign trade. The alphabetical arrangement makes it a handy reference work for the busy exporter or importer. The book contains also a list of the topics of national importance which are engaging the attention of the Chamber of Commerce Committee. As the first publication of its kind, the book meets a distinct need in foreign trade circles.

Thank You, Mr. Shultis!

And we will be glad to do as much for EVERY Instructor in Manual Training.

THE following communication reflects the tone of numberless letters received from Manual Training Schools throughout the country, that have adopted Disston Educational Literature as standard in their classes.

Ukiah Union High School,
Ukiah, California,
November 15, 1922.

Henry Disston & Sons, Inc.,
Philadelphia.

Gentlemen:

I am teaching agriculture and farm mechanics in this high school and know you have some charts and booklets that will be of great use to me. I refer in particular to the Saw Chart; File Chart; The Pruning Book; The Saw in History; The File in History; Saw, Tool, and File Book; The Lumberman's Handbook, and others.

I am a sincere believer in good tools and am trying to teach my boys in school to choose good tools. Our shop did have quite a number of inferior saws but I am now going in for Disston No. 12 Hand Saws. I consider them the best saws made. I could give you plenty of good testimonials on the Disston Saw from my own experience here and in the Engineer Corps in France as well as from my father and grandfather, all good carpenters. I consider it a public service to aid in the distribution of Disston Saws.

Yours truly,
Arthur Shultis,
Director of Agriculture.

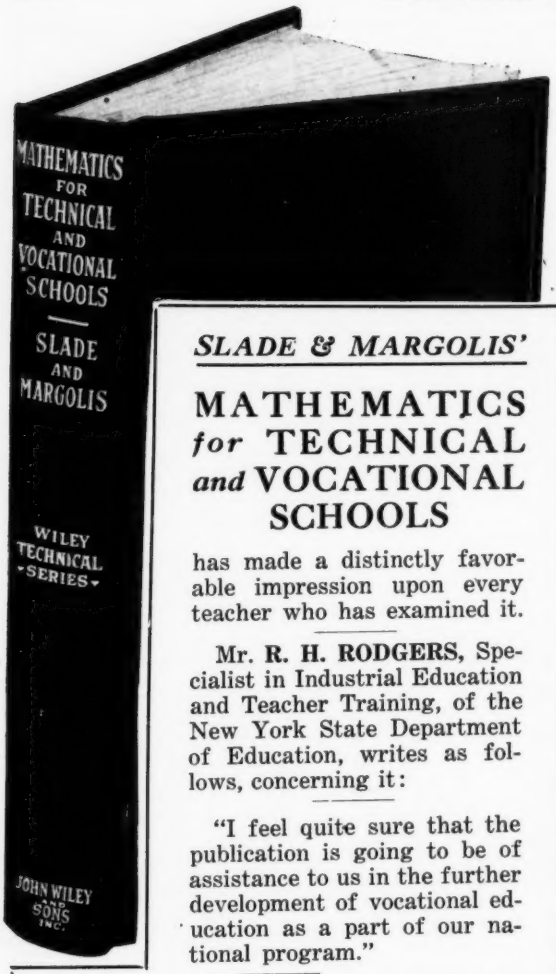
The Educational Department of Henry Disston & Sons, Inc., has taken infinite care in the preparation of the Charts and Hand Books listed below. Any of these will be sent you in desired quantities for your classes. We give you these freely and place our Educational Department at your service at all times.

Kindly address "Department L"

Saw Chart
File Chart
The Pruning Book
The Saw in History
The File in History
Saw, File and Tool Book
The Lumberman's Handbook
How a Disston Hand Saw Is Made

Henry Disston & Sons, Inc.

"DEPARTMENT L" PHILADELPHIA, U.S.A



SLADE & MARGOLIS'

MATHEMATICS *for* TECHNICAL *and* VOCATIONAL SCHOOLS

has made a distinctly favorable impression upon every teacher who has examined it.

Mr. **R. H. RODGERS**, Specialist in Industrial Education and Teacher Training, of the New York State Department of Education, writes as follows, concerning it:

"I feel quite sure that the publication is going to be of assistance to us in the further development of vocational education as a part of our national program."

Another prominent educator said of it: "This book is one of the very best of its kind, and since it is made up of work which has been tried out by the authors in actual classroom teaching in vocational schools, I am sure that it will be appreciated by teachers of trade mathematics, throughout the country.

Slade & Margolis' "Mathematics" is a WILEY TECHNICAL SERIES book, and was edited by JOSEPH M. JAMESON.

491 pages. 5¼ by 7⅝. 353 figures. Cloth, $2.50.

Published by

JOHN WILEY & SONS, Inc.

432 Fourth Avenue New York

FREE EXAMINATION COUPON

John Wiley & Sons, Inc., 432 Fourth Avenue, New York City.

Kindly send me a copy of the following books on 10 days' Free Examination (teachers allowed 60 days):

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I-AM 2-23

NEWS AND NOTES.

Branch Society Formed. Permanent organization of the Puget Sound Branch of the National Society of Vocational Education was effected on December first, at Tacoma, Wash., at a meeting of more than 200 teachers of vocational training in the Lincoln High School.

The meeting was opened with an address of welcome by Supt. W. F. Geiger. Prof. H. C. Hines of the State University, gave a talk on "Educational Tests and Measurements." Mrs. Cora Alney and Stephen I. Miller, dean of the School of Business, University of Washington, also spoke. Mr. W. L. Edwards, at the commercial conference, acted as chairman, and Mr. Stephen Dwan spoke to the assembled teachers. Miss Wilhelmina Badder, of the West Seattle High School, talked on "Placements" and Mrs. Celia D. Shelton, of the Seattle Vocational Department, discussed "Retail Selling."

The industrial conference, which was in charge of Mr. Charles T. Miller, manual training supervisor at Tacoma, was opened with an address by Mr. Miller on "The University of Washington Apprenticeship." "Electricity in School Shops" was discussed by J. W. Mann, electrical instructor at the Lincoln High School, Tacoma. There were also addresses on printing and on organization of part-time schools in small cities.

The home economics conference was in charge of Miss Anna L. Post, supervisor of home economics, Tacoma. Miss Mary A. Davis gave an address on "Relation of Home Economics and Textiles to Retail Selling" and Miss Ruth Lusby, of the University of Washington, spoke on "Cafeteria and Institutional Management."

Mr. J. A. Guitteau, supervisor of agricultural education in Washington, had charge of the conference on agricultural education. The problems connected with the subject were discussed by several speakers.

At the business meeting on Friday, the organization of the Puget Sound branch was perfected and officers elected for the ensuing year.

Growth of Vocational Training. An enrollment of 457,828 pupils in 4,945 vocational schools receiving federal funds, as against 324,247 a year ago, is reported in the latest annual report of the Federal Board for Vocational Education. Teachers in these schools numbered 12,280, compared with 10,066 reported last year.

The report shows that the fiscal year of 1921-22 witnessed the greatest expansion in the state and federal vocational education program of any year since the constitution of the board. Special effort was made during the year toward the development of the part-time school. Of the total enrollment, 228,655 pupils are in attendance at part-time schools, 133,835 at evening schools, and 113,333 at all-day schools. Classified by subjects, 130,973 are studying in trade and industrial schools, 60,236 in agricultural schools, 118,708 in home economics schools, and 165,911 in general part-time continuation schools.

Vocational Training Successful. More than 75 per cent of the young people of Indiana who have had vocational training are engaged in the occupations for which they were trained, according to a bulletin just issued by the State Education Department. The Department shows that 76 per cent of the boys at work who have had vocational agriculture in Indiana high schools are engaged in farming. Seventy-nine per cent who have had industrial training are working at the trades for which they were trained.

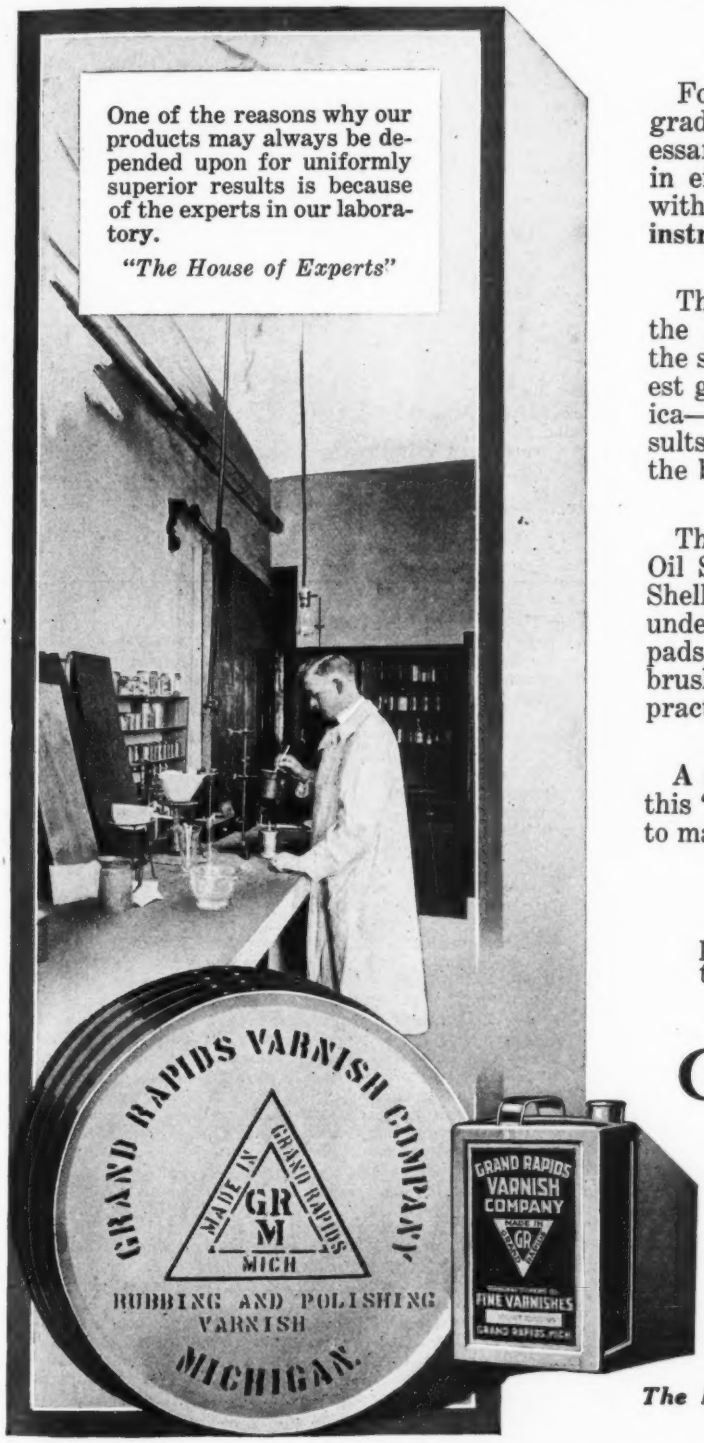
Vocational agriculture training is increasing the wealth of the state by improved methods of farming, it is pointed out. In Shelbyville, the boys of the vocational class tested 16,000 ears of seed corn in one year. This tested corn was planted on 32 Shelby County farms and yielded eleven per cent more than the untested corn on other fields in the same county.

Training in the trades is improving industrial conditions in the state, the bulletin also states. Employers state that whereas they were formerly compelled to take green boys and train them as best they could, with a loss of six months' time to the boy and to themselves, now with the special training given, they can begin work at good wages as soon as they enter the shop.

More Industrial Education. At the annual meeting of the American Society of Mechanical Engineers held in December, reports were submitted by experts showing the status of industrial education in the country and the efforts being made to link the schools with the workshop in a nation-wide plan for providing instruction for the workers in industrial shops.

(Continued on Page XXIV)

A PRACTICAL
Wood Finishing Equipment
For Manual Training Schools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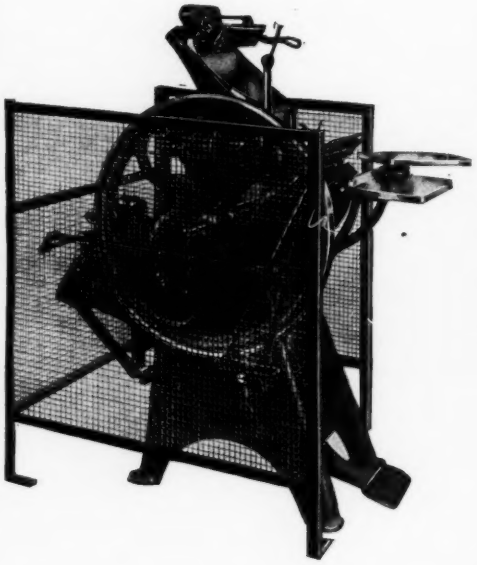

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(Continued from Page XXII)

The report declared that industrial education has advanced in a truly remarkable way and promises much for the future. More than 100,000 persons are studying in trade extension classes in New York alone, and 325,000 are studying in Federal vocational schools supported by contributions from the Smith-Hughes Fund. The investigating committee found that more than 4,000,000 students in the country have completed correspondence courses.

President I. N. Hollis of the Worcester Polytechnic Institution, Worcester, Mass., pointed out that while correspondence instruction lacks the contact among students that promotes discussion and supplies stimulus for study, it more than makes up for that in the serious purpose of every student, and in what must be confessed is superior instruction. He declared the correspondence school can afford to employ the very best talent in the country for preparing textbooks, and can lend to the work a degree of technical skill that one cannot find in the average college.

Chicago Industrial School. A large up-to-date industrial school is planned in Chicago, in connection with the Art Institute and the Association of Arts and Industries. The school which is intended to supply a great need in the country, will teach industrial art, pottery, weaving, metal and glass work, jewelry, printing, interior decoration and costume design.

Folk Handicraft Exhibit. An attractive display of folk handicraft was shown December 6th at the Denison House, Boston. The skilful achievements of Syrian, Italian, Armenian and Greek needleworkers made an attractive and informing display. The Italian workers are particularly clever with the needle and are skilful in making elaborate tassels and delightful embroideries. The Syrian women employ needlepoint, decorating with simple but effective edgings, table covers and curtains and the further elaboration of tassels which become handsome floral devices. The Greek workers reflect a special love for color and use threads of different colors with unusual devices in women's and children's dresses.

At the exhibit were many examples of Italian pottery of specially selected design, and others of rough English and Spanish origin, while Spanish confections were exhibited and offered for sale.

The Folk Handicrafts Guild was established as a separate guild, at Denison House, Boston, in 1910. The guild is under the direction of Miss Enid B. Johnson.

School of Carpentry. One of the ten schools of carpentry, which are to be placed in the largest cities, is to be located at McKenzie, Tenn. The schools are established and financed by the Tennessee Council of Carpenters and Joiners of America, for the purpose of placing the finishing touch of efficiency in the hands of its members.

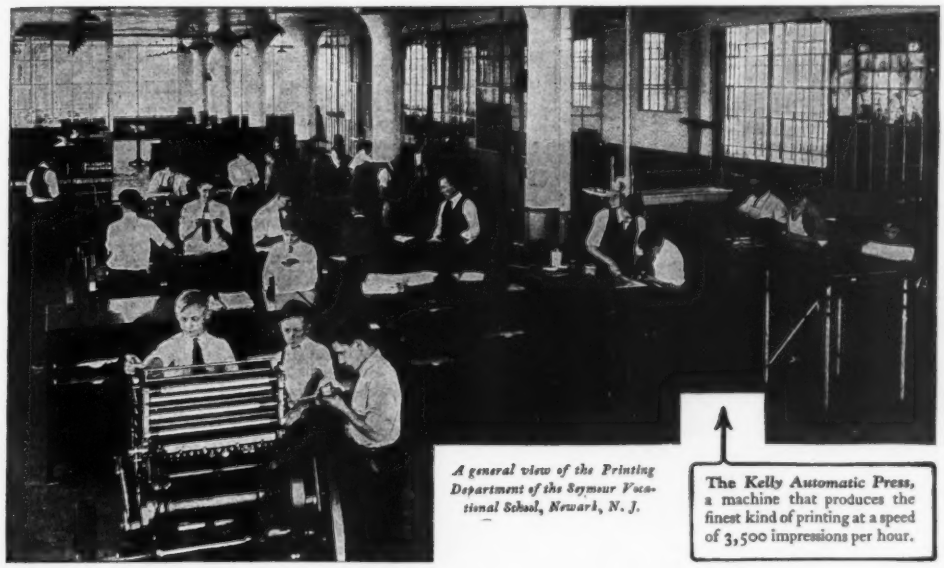
Vocational Guidance. The high school advisers at Topeka, Kans., are pursuing their work of guiding the students to a choice of studies, with the help of information compiled by the vocational guidance committee. The data comprises information for vocational men and women, and contains facts for persons other than high school students. In all, fifteen trades for men and eight for women are listed. In each case, the information comprised the number of persons engaged in the particular trade, the time required to learn it, the average wage scale, the minimum wage, the length of the working day and week, and the average length of employment in the year. An idea of the useful character of the information on trade opportunities may be obtained by studying a typical trade. For example, take the following:

Iron workers' trade (including railroad shops and other shops)—workers employed, 200. Time required to learn the trade, four years. Minimum wage, 77 cents; average wage, 82 cents; apprentice, first year, 34-36½ cents per hour; second year, 39-41½ cents per hour; third year, 44-46½ cents per hour. Hours per day, eight; hours per week, 52. Average employment per year in weeks, 52.

New Courses. The Massachusetts State Board has approved new courses in electricity and sheet metal, which have been introduced at the East Dwight Street School, Holyoke, Mass.

Foremanship Training. Twenty-five students have been enrolled in the class in foremanship training at the East Denver High School, Denver, Colo. The course embraces practically all the wood working and metal trades and is applicable to all crafts. The instruction is given

(Continued on Page XXVII)



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(Continued from Page XXIV)

under the direction of George H. Wilson, instructor in trade and industrial training.

Vocational Course. The first course in the newly organized vocational school in Shorewood, near Milwaukee, Wis., was opened on December 28th with a class in radio telephony. The course has been started in accordance with a plan for a vocational school as required by law.

The school has included in its plans such courses as home making, decorative design, commercial and industrial subjects, millinery, salesmanship, bookkeeping, elementary electricity, wireless telegraphy, manual arts, automobile mechanics, wood working and drafting.

Display of School Handwork. The Girls' Vocational School, at Newark, N. J., during the first week of December, held a sale of products made in the school. Contributions were received from classes in design, dressmaking, millinery and cooking. Hand embroidery which finished many products of the sewing classes showed how the art department cooperates with the pupils in carrying into effect the training given in line and color. The art department had its own display of things for personal wear or household decoration. Among the articles which proved salable were curtains, luncheon sets and cushions.

Building Trades School. The demand for skilled mechanics has exceeded the supply and the condition has become more serious since the war. In Chicago recently, steps were taken to meet the situation. The Citizens' Committee to Enforce the Landis Award, in conjunction with the several contractors' associations in the building trades, opened a trade school for the training of workers in the building trades.

The purpose of the school is to bring back on a better footing the apprenticeship system. To date, classes have been opened in sheet metal work, bricklaying, plumbing, carpentry, painting, and other trades will be added. Mr. C. L. Bailey, of Cincinnati, has been appointed as director and is assisted by a group of trained instructors.

At present there are day classes for apprentices and evening classes for mechanics. Each trade conducts two evening classes each week. The apprentices are given two weeks of intensive training in the principles of their respective trades and are assigned to one of the shops to serve their apprenticeship.

A recent survey of more than 200 students in the high school at Rice Lake, Wis., regarding their future occupations, reveals that a large number of the students is attracted by the teaching profession. Of 41 occupations named, teaching was chosen by 27 per cent of the students. Fourteen per cent are preparing themselves for office work. Farming was selected by only three per cent. Other occupations named were baking, millinery, dentistry, photography and accounting.

Crafts Work for Shut-Ins. The vocational committee for shut-ins of Chicago has carried on a successful plan of vocational training in crafts work whereby shut-ins or handicapped persons may become self-supporting through the work of their hands. The products of these workers are offered for sale.

Employment Bureau. The vocational school at Wausau, Wis., has opened a junior employment bureau with Mr. E. A. Holm in charge.

Shops Installed. Machine, sheet metal and other manual arts shops will be installed in the new three-story high school to be erected at Trenton, N. J. The building will cost $900,000.

Automobile Mechanics Shop. The school board at St. Louis, Mo., has ordered the preparation of sketch plans for an automobile mechanics building for the continuation school.

Continuation Teachers' Program. The school board at St. Louis, Mo., has approved a change in the rules governing continuation teachers' programs. Under these rules, the number of hours' service per week required of regularly employed continuation school teachers must not be less than is required of teachers in elementary schools. No teacher may be assigned to follow-up work exclusively.

Adopts Vocational Guidance Program. Erie, Pa., has adopted the vocational guidance program originated and sponsored by the State Department of Public Instruction. The local guidance program is conducted under the direction of a general council of guidance, headed by Mr. C. F. Brockway.

Under the state department's plan, the local committee in charge of the work is composed of representatives from all the schools, who are charged with the selec-

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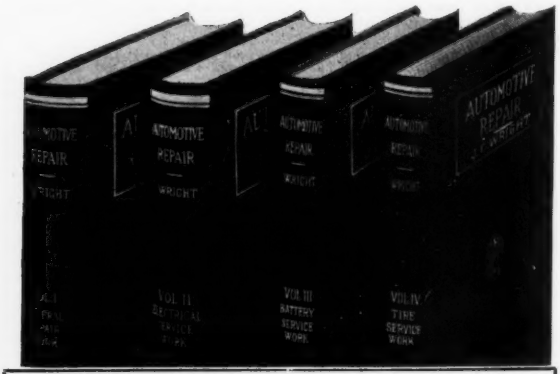

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I-AM 2-23

tion of material for distribution and use in the buildings. Smaller groups work out special topics suitable for discussion and study. The state department furnishes themes for projects, references, records and outlines, and the committee selects such as it believes are adaptable to the needs of the schools. Mimeograph sheets are prepared and distributed to the schools, placing at their disposal useful, usable and adapted information for every building.

Trade Extension School. An experimental school to minister to the needs of the individual in an industrial way has recently been established in a converted residence, at 135 East 37th St., New York City. In this school pupils are given a chance to find out exactly what they can best do and are allowed to develop their bent with all the help and cooperation that teachers can give. The course will cover two years, part of which will be academic work applied to definite ends, and the instructors will be selected for their ability to deal with problems that these pupils will face in developing their natural bent.

The purpose of the school is to avoid mistakes in judging children's ability and to assist a specialized group whose aptitude is to be tested. When the aptitude is discovered, it will be encouraged and the school will thus be able to turn out graduates able to apply themselves to the tasks awaiting them without feeling that they are handicapped by a bad school record.

The school will accommodate at first about one hundred girls ranging in age from 15 to 16 years. The pupils at first will be given simple tasks and later will be given more difficult work in their chosen field of activity. They will be taught to use the fundamental tools for sewing, machine work, hemstitching, care of the home, and other forms of home economics. It is planned to select the pupils for admittance so that only those which the school can serve will enter. Miss Florence Marshall is in charge of the school, assisted by three other teachers who have charge of special branches of the work.

Part-time Education. The department of part-time education at San Diego, Calif., opened its third year with an enrollment of 300 and with every prospect for a steady increase. The response of employers of the city has been gratifying showing that they are convinced of the need of the work. The school offers a much broader program of courses this year so that the needs of each pupil may be taken care of, no matter in what occupation he may be engaged. For boys with ability along mechanical lines, courses in automobile mechanics, machine shop practice and woodwork are offered. The two home making classes for girls which include dress making, millinery and cooking have proven popular.

Industrial Teaching. The industrial teachers of Johnstown, Pa., have undertaken an extension course under the direction of the University of Pittsburgh. The course is given by the Director of Vocational Education, Mr. James Killius, and has attracted the interest of the teachers.

Vocational Courses. The vocational evening school at Johnstown, Pa., offers courses in machine shop practice, printing, blue print reading, mining, mechanical drawing, plumbing and show-card writing.

Plumbing. A plumbing class has been established at Johnstown, Pa., under the direction of the city plumbing inspector. The class was organized upon the suggestion of the master plumbers' association.

Exhibit School Work. An exhibit of industrial work was held recently at the Kiwanis Club Industrial Exhibition, at Johnstown, Pa. The wide variety of products made in the school shops, as well as the excellence of quantity production of school furniture, was brought forcibly to the attention of the school patrons and the general public. More than 60,000 persons visited the exhibition where they learned for the first time that the school shops have passed the manual training stage.

Cooperative Trade Training. Ninety boys of the senior industrial classes of Central High School, Philadelphia, Pa., have been placed with various industrial employers on a cooperative basis. About 25 firms are represented by the cooperative students. The school has the cooperation of the White-Williams Foundation and of the Junior Employment Service of the board of education, in the placement and follow-up of the boys.

Part-Time Classes. A request has recently come to the school board of Philadelphia from the local building trades congress for the establishment of part-time and evening classes in plastering. These classes are needed to meet the demand in the trade for trained mechanics.

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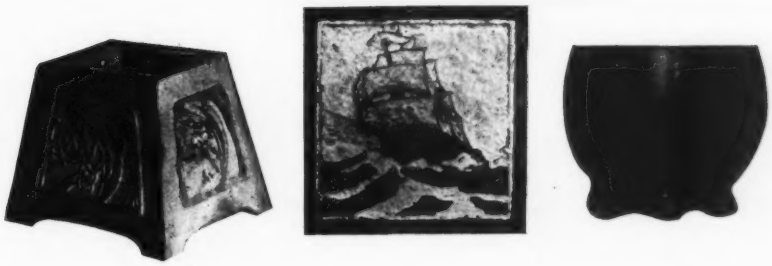

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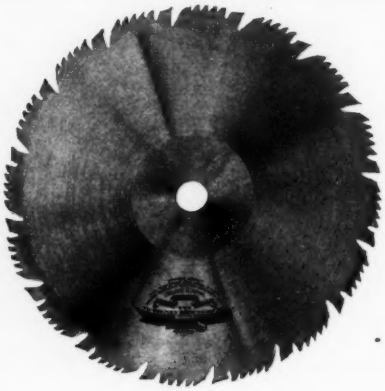

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It is a book that can be recommended without reservation to all teachers of shop mathematics and such instructors may obtain copies for examination by sending this "ad" with their name and address to the D. Van Nostrand Company, 8 Warren Street, New York.

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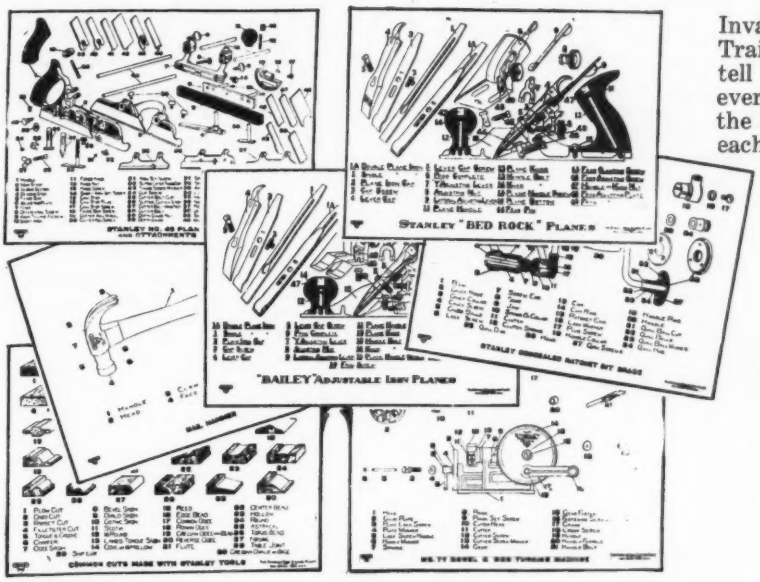

Invaluable for every Manual Training class, because they tell the student, at a glance, every part of the Tool, and the correct technical name of each part.

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to any teacher of Manual Training making a request for same.

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THE STANLEY WORKS, New Britain, Conn.

NEW YORK CHICAGO SAN FRANCISCO LOS ANGELES SEATTLE

Manufacturers of Wrought Hardware and Carpenter Tools.

(Continued from Page XXVIII)

Prevocational Work. It has been the policy of the supervisory heads to replace some of the handwork courses in fifth and sixth grades at Pittsburgh. A number of centers for over-age or retarded pupils has been established where handwork is given intensively. In one of these centers, the work has attracted the children and a waiting list is maintained. The schedule provides one period of shop mathematics, two periods of drawing and three periods of shop work. The work is extensive and satisfactory. Among the articles constructed by the class were bulletin boards for classrooms, an office letter file, benches for the swimming pool, teachers' book racks, mail boxes, and a model of Mt. Vernon.

In addition, a number of repairs were made to such articles as chairs and stools, and room door numbers were changed. Work has begun on the construction of 60 aeroplanes, 100 beds, and 67 folding chairs for the schools.

Teacher Training. A class in vocational teacher training was opened in the fall at York, Pa. This is the third season that Pennsylvania State College has conducted these classes in York. The teachers are part of a class of 55 studying educational measurements under Dr. Frank H. Kraemer.

New Equipment. A new lathe, drill press, power press, forge and vulcanizing machine have recently been installed in the industrial department of the high school, at Lock Haven, Pa. The machines are driven by individual motors. A full equipment of tools has been installed in the automobile mechanics department.

Automobile Mechanics. Eighty-seven men are at present enrolled in the automobile department of the Academy Evening School, Erie, Pa. This is the first year this subject has been offered in the evening school.

Printing Work. Since the opening of school in September, the printshop at the Academy High School, Erie, Pa., has turned out one hundred jobs with a commercial value of about $700. Four school papers were printed during the period.

Electrical Equipment. New equipment for the electrical shop at the Academy High School, Erie, Pa., was installed recently at a considerable saving of money. The students have installed a switchboard which serves as a central station for the shop.

Trade Drafting. The vocational teacher training class at Bethlehem, Pa., has undertaken a course in trade drafting in a unique manner. The membership of the class, consisting of 20, is made up of draftsmen, engineers, machinists, electricians, pattern makers, carpenters and related subjects teachers. The men are grouped on the plan of an industrial drafting room, those with some experience being assigned designing projects, and those with less experience assigned to detailing projects from the designs of the more experienced workers. Men representing the other trades are taken into consultation on the shop aspect of design with the result that a wealth of practical information is gathered for the benefit of the entire class. The instructor acts in the capacity of chief draftsman.

Growth of the Pennsylvania Society. The Pennsylvania Society for Vocational Education has been in existence two years. During this period, the membership has grown considerably and the interest in the work of the society has increased on all sides.

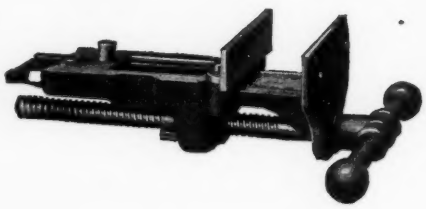
The meeting this year was of particular interest for a number of reasons. The entertainment committee arranged excursions to industrial plants which offered attractions for agricultural, art, home economics, commercial and industrial teachers.

The luncheon meeting of the Society, which took place on December 29th, was honored in having as its principal speaker, Mr. E. G. Grace, president of the Bethlehem Steel Corporation.

Acetylene Welding. An acetylene generating outfit has been installed in the high school at Williamsport, Pa., for use in instructing shop students in welding.

Automobile Repair. Practical experience in automobile repair is gained by students in the Veterans' Trade School, Williamsport, Pa., by working on cars used by government employes in the city. During the Christmas season the shop took the overflow from the postoffice garage. The students of the electrical department of the same school have installed a five-panel switchboard for use in electrical testing.

COLUMBIAN
Sledge-Tested VISES



THE most varied, and by far the most complete line of vises for blacksmith, carpenter and machine shops of manual training schools is the Columbian line. Every type, size and grade of vise used in Manual-Training work is included —as the Columbian catalog will show. We solicit the inquiries of vocational supervisors, principals and teachers.

The Columbian Hardware Company

World's largest makers of Vises and Anvils

Cleveland, Ohio.

Teacher Training. Seventeen teachers have enrolled in the State College teacher training class organized at Williamsport, Pa. Each student has prepared a plan for a shop in which his trade can be taught, and has compiled a list of equipment and supplies for use in this shop.

Industrial Inspection Trips. Industrial inspection trips have formed an important part of the Smith-Hughes work carried on in the high school at Williamsport, Pa. Students in trade chemistry visited the plants in which problems in applied chemistry might be observed. Groups from the school shops visited plants where modern trade methods were used, in order that they might become informed on the best methods in the trades they are learning.

A Vocational Plumbing Project. In the Fairview School, one of the grade schools at Altoona, Pa., difficulty was experienced in heating the third floor of the structure. It was decided to use an extra boiler, obtained from one of the other buildings where it had been discarded. The vocational plumbing department of the high school was given the project. This consisted of the making of plans and specifications from which bids might be asked for the installation of the system.

Upon investigation it was discovered that the cost of the plan would be prohibitive. It was also found that while the size of the radiators was sufficient to heat the rooms, the pipes supplying them were too small to carry the required amount of steam.

The cost of enlarging the feed lines was compared with the cost of changing the system to a two-pipe vapor system. There was very little difference in cost and it was found that the latter plan could be used without interfering with the present system so that the rooms could be used at all times. The plumbing department so recommended to the secretary of the board, and steps were taken to prepare plans and specifications which would cover the change so that bids could be advertised for.

The fifth anniversary of Miss Grace Schermerhorn as director of cooking of the New York schools was observed by three hundred teacher members of the Home Economics Association, at the Hotel Astor. Associate superintendent Gustave Straubenmuller was one of the speakers of the occasion. He noted the fact that 900,000 school lunches had been served during the past year.

At Centralia, Ill., the upper classes in the grade schools entered into a poster contest. These posters are to advertise the furniture industries and the drug stores. Some 600 entries were made. Prizes were given for the best designs.

"The time of the real home seems to have passed," recently asserted Mrs. Henrietta W. Calvin, director of home economics of the Philadelphia schools. "Home economics in the schools is now a vital necessity. Thousands of girls grow to womanhood without having been given any conception of home ideals by their mothers."

PERSONAL NEWS.

Mr. George R. Thomas, for three years principal of the trade school at Bethlehem, Pa., has resigned to become sales-manager for a large publishing firm. Mr. E. J. Overfield, instructor in industrial arts, has been appointed acting principal in place of Mr. Thomas.

Mr. Wm. C. Ash, director of practical arts and vocational education at Philadelphia, has become professor of vocational education and director of vocational teacher training at the University of Pennsylvania.

Mr. Charles F. Bauder, formerly head of the department of mechanic arts and industrial education in Central High School, Philadelphia, has been elected director of industrial arts education, in charge of the supervision of work in grades five and six, seven and eight, junior and senior high schools, and industrial education in the high schools and part-time and evening schools.

Mrs. Henrietta W. Calvin, specialist in home economics for the United States Bureau of Education, has been elected director of home economics at Philadelphia, Pa.

Mr. Clyde S. Warne, for the past four years connected with the technical department of the San Diego High School, at San Diego, Calif., died on November 11th after a brief illness.

Mr. Huger Elliott, principal of the School of Industrial Arts, Philadelphia, Pa., has been appointed a member of the advisory board for the exhibition of American Art, which will be held in Paris, in 1923, under the patronage of the French government.

ART-FIBRE WEAVING

Teachers and Students

have been quick to recognize the advantages of Art-Fibre as the ideal material for weaving lamps, baskets, ferneries and many other practical pieces of furniture.

Our method of furnishing the frames knocked-down and all material complete for each design, has placed within the reach of all an interesting and instructive art, and a method of acquiring many beautiful pieces for the home at a very small cost.

You can make these designs and get real enjoyment weaving alone or with a class of friends.

The result will be a finished design which you will be glad to display in your home.

No. 42
Smoking Stand

Chair No. 900

Floor Lamp No. 200

FLOOR LAMP No. 200
Height 68″

Frame (knocked-down), two light brass electric fixture, 12′ insulated cord, weaving and finishing materials.
Varnish Finish $7.95
Enamel Finish 9.00
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Complete illustrated instructions with this design.

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Frame (knocked-down), seat springs, cretonne upholstering (spring filled cushion as illustrated), weaving and finishing materials.
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Enamel Finish 17.00
Duo-tone Enamel Finish..... 17.30

SMOKING STAND No. 42

Frame (knocked-down), weaving and finishing materials.
Varnish Finish $1.65
Enamel Finish 1.75
Duo-tone Enamel Finish..... 2.05
Complete instructions with this design.

We Furnish All Necessary Materials

Complete for each design at one price or you may purchase them in separate units. Frames are shipped knocked-down with all holes properly bored and joints fitted for assembling.

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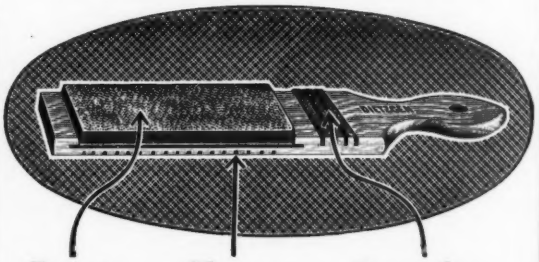
A Time-Saving
Pencil Pointer



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ESSEX COUNTY ARTS ASSOCIATION MEETS.

The Essex County Arts Association of New Jersey held its last meeting December 6, at the Boys' Vocational School, Newark, N. J. The household arts section, which was in charge of a special chairman, listened to a talk by Miss Lillian H. Locke, on "The Clothing Budget"; the vocational department to a talk by Mr. C. J. Sanborn on "The Relation of Vocational Training to the Industries"; the industrial arts department to an address by Mr. Philip Wagner, on "Mechanical Drawing"; the printing department, to a talk by Mr. David Daniels, on "Printing"; the machine shop department, to a talk by Mr. C. F. Moore, on "The Place of the Completed Project in the Machine Shop," and the wood working department, to a talk by Mr. Martin J. Corcoran, on "Present Tendencies in Shop Work."

The fine and applied arts department which was in charge of Miss Della Hackett, was divided into sections on the arts and crafts, poster advertising, interior decorating and textile design. Miss Ida W. Stroud, Miss Mable Gaston, Mrs. Payton and Miss Hopper had charge of these sections respectively.

At the meeting there were exhibitions of work in freehand lettering, costume design, Christmas greeting cards, tie-dyeing, weaving and tray-making.

NORTHWESTERN ARTS ASSOCIATION MEETS.

The Northwestern Arts Association of Pennsylvania met on December 16 at Erie. The general meeting of the association was held in cooperation with the Erie City Institute. Dr. Arthur D. Dean of Columbia University, was the principal speaker. The sectional meetings followed the general meeting and a luncheon was held for the entire group at noon, followed by the business session.

METROPOLITAN ARTS TEACHERS MEET.

The Metropolitan Arts Conference held its annual meeting December 9, at the Central High School, Philadelphia, Pa. Dr. O. P. Cornman, of Philadelphia, presided at the general meeting at noon, following the sectional conferences.

At the general meeting, Mrs. Henrietta W. Calvin, recently appointed director of home economics education in Philadelphia, was presented to the group.

INDUSTRIAL TEACHERS MEET.

The industrial arts section of the western Pennsylvania Educational Association met on December 2, at the Schenley High School, Pittsburgh. There was a large representation of teachers and other schoolmen. Mr. Rodney Brace, of Homestead, presided at the sessions, and Mr. James R. Glenn, of Pittsburgh, acted as secretary.

At the meeting, nine short talks were given in a more or less informal manner, followed by a summary by Dr. Harry B. Smith, director of vocational teacher training at the University of Pittsburgh.

Mr. James C. Tucker, of Bethlehem, president of the Pennsylvania Society for Vocational Education, gave some of the details for the society's next meeting and made a strong plea for a large attendance.

MOUNTAIN ARTS ASSOCIATION MEETS.

The Mountain Arts Association of Pennsylvania held its fall meeting on November 18, at Altoona. The sectional meetings were held in the morning, while the luncheon meeting of the combined association was held at noon.

Through the cooperation of the Bureau of Vocational Education at Harrisburg, a member of the department was present at each of the four meetings. Mr. Owen D. Evans represented the department at the commercial section meeting, Mr. C. Valentine Kirby attended the art education section, Mrs. Anna Green acted as discussion leader for the household arts section, and Mr. William Penn Loomis contributed to the meeting of the industrial section. Following the luncheon, Mr. Evans spoke on the subject, "Practical Arts Work in the Junior and Senior High Schools."

More than seventy members were in attendance and twelve of the thirteen counties included in the Mountain Arts territory were represented at the meeting. The most inspiring feature was the number of cities and towns of the Central Arts district represented by delegates in attendance.

The next meeting of the association will be held at Lock Haven.

The officers for the ensuing year are as follows:

President, Dr. Nelson P. Benson, Lock Haven; Vice-President, Mrs. Goodwin, Williamsport; Corresponding

To start RIGHT

—start with Starrett Tools. You will find this set of Starrett Tools admirably adequate and exceptionally well suited for precision work. Contains 6 inch Combination Square Complete, Center Punch, 6 inch Flexible Steel Rule in Pocket Case, Center Gage, 4 inch Caliper, 4 inch Outside Caliper with Solid Nut, 4 inch Inside Caliper with Solid Nut, 4 inch Divider with Solid Nut.

In attractive folding leather case.

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The World's Greatest Toolmakers
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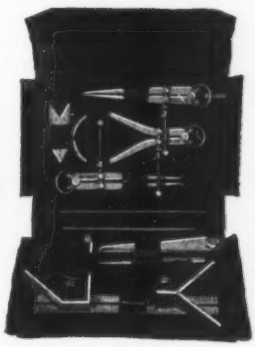

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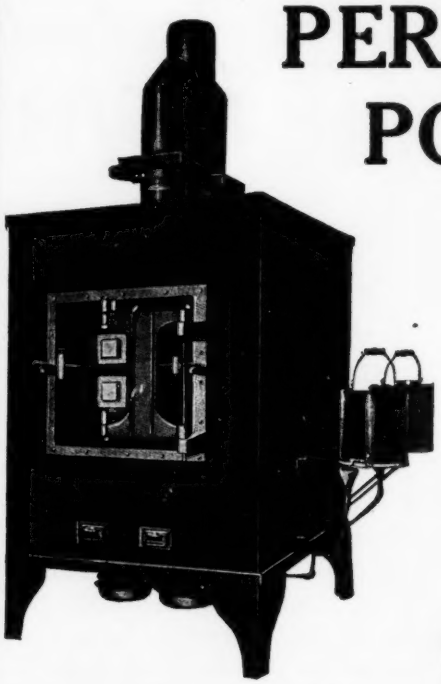

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lettering. Complete descriptive circulars are available. Secretary, Miss Sally Lawrence, Lock Haven; Recording Secretary and Treasurer, Miss Audry, Bellefonte.

PENNSYLVANIA VOCATIONAL MEETING.

The Pennsylvania Society for Vocational Education held its meeting in connection with the State Education Association on December 27, 28, and 29, at Bethlehem.

The general meeting of the vocational and arts department was held on December 27, and the sectional meetings of the departments on the 28th.

Among the chief attractions were the trip to the home plant of the Bethlehem Steel Corporation and the annual luncheon of the Society at the Hotel Bethlehem. Mr. E. G. Grace, president of the Steel Corporation, was the principal speaker at the luncheon.

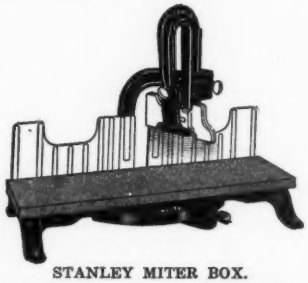
BUYERS' NEWS.

Power Rotary Shears. The Niagara Machine & Tool Works, Buffalo, N. Y., have just issued Bulletin No. 70 on Power Rotary Shears. The bulletin illustrates and describes the entire line of Niagara Circle, Ring and Slitting Shears from the smallest type designed to accommodate light gauge metal to the largest heavy duty shear and flanger. Included in the publication also are several types of Gap, Waugh, Horn and Squaring Shears. The bulletin will be sent to school authorities on request.

New Circular. Teachers will be interested in a circular just issued by the John Steptoe Company, Cincinnati, describing the improved Steptoe Standard Engine Lathes. The lathes are made in 14-inch, 16-inch, 18-inch and 20-inch sizes, with quick change gear box and meet in every respect the slogan, "quality without frills". The circular gives the complete specifications and details of regular threads and feeds and special equipment. Copies will be sent to any teacher on request.

"Everyday Art" is the title of a new periodical just inaugurated by the American Crayon Company, Sandusky, Ohio. The fact that the publication is edited by Miss Bonnie E. Snow and has an advisory board including Frank A. Parsons, Norma E. Stahle, George S. Dutch and Pedro J. Lemos gives promise that the publication will be of high artistic and educational merit and will contain a considerable amount of practical material of everyday use in elementary and secondary schools. The opening number contains an article on "The Use of Crayons in the Graphic Arts" by Pedro J. Lemos, an illustrated paper on the use of wax crayons by children, a discussion of Dynamic Symmetry by Jay Hambidge, an illustrated article on the "Decoration of a Candle Stick" by Olga R. Hannon. Copies of Everyday Art may be had upon application to the Sandusky or New York offices of the American Crayon Company.

New Stanley Miter Box. A new model of the well known Stanley miter box has been placed on the market. It differs from the older models in that the saw support is a singer study casting, mounted back of the table and



STANLEY MITER BOX.

attached to the swivel with a positive locking arrangement. The arrangement leaves the table entirely free from the front and sides and increases the speed with which work may be inserted and removed.

New Ames Lettering Instrument. The O. A. Olson Manufacturing Company, Ames, Ia., has just put on the market a new device for aiding draftsmen in working out lettering in mechanical drawings. The device consists of a celluloid disk, mounted on a white metal wire holder. The disk is perforated and equipped with circumference degrees. It is ingeniously arranged so that it can be used for laying out lettering of any size and any angle of slope and can be applied to large block lettering and fancy lettering. Complete descriptive circulars are available.

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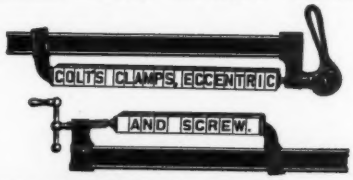

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We shall have booth No. 15 at the Auditorium during the meeting of the Department of Superintendence at Cleveland, Feb 25-March 1. We extend a cordial welcome to all attending the meeting to call at our booth.

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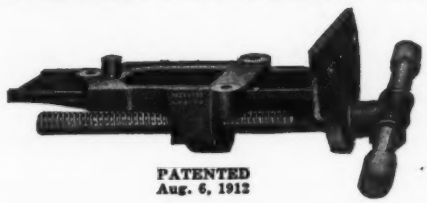

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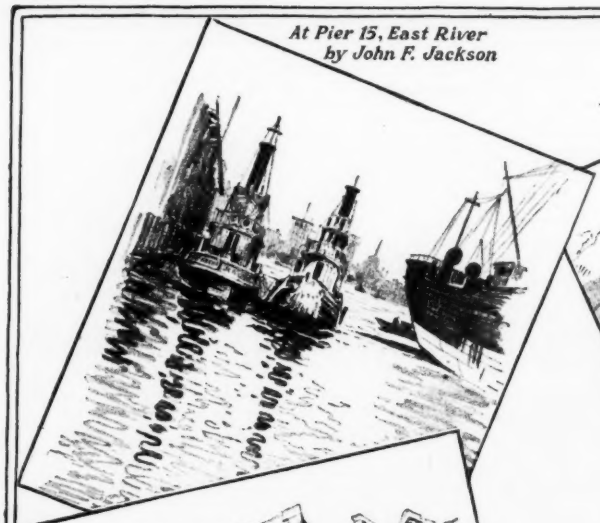

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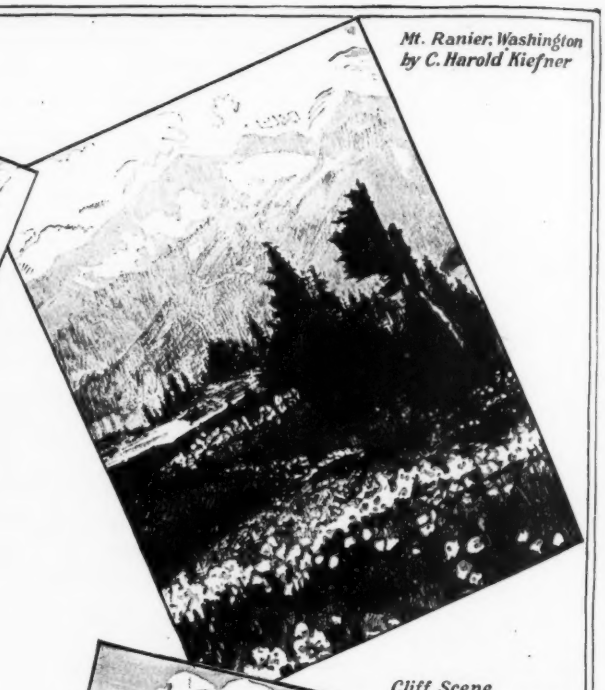

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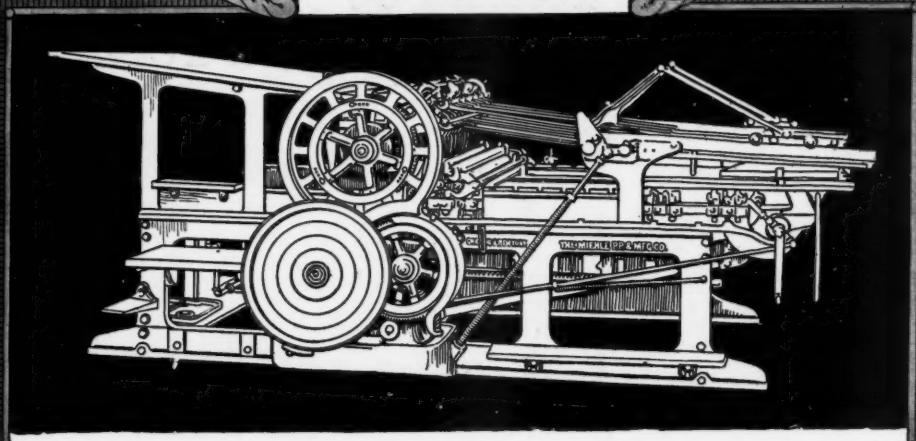

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